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Plant Acrobats

By W. HENRICKS HODGE
Photographs by the author

WHO has not seen at some time or other a climbing vine—an ivy on college walls, honeysuckle on an old fence, or, in a garden, perhaps "Kentucky Wonders" on a bean pole? Remarkable plants are these—climbers of a sort that have as many and varied climbing tricks as a troupe of circus acrobats. Unlike the circus troupe, however, they are catering not to the audience in the stands but to the audience of the sun.

Like many other living creatures, everything green needs and demands its place in the light, and unless it gets that place it frequently wastes its way along the path of death. For that reason we find certain plant species that have taken up a climbing habit, and with some sort of support these individuals are able to get out of the oppressive shade to a place where their own leaves may be better distributed in life-giving sunlight. Such plants are our familiar vines, climbers, or creepers. We expect to find them, not in open fields where the climbing habit is not needed, but in the shaded glades of forests where there are both need and support for one acrobatically bent. And so, as we would expect, forests are generally the homes of plant acrobats.

Climbers may be of several different types: annual herbs like the sweet pea or garden pole bean, or perennials like our familiar cultivated vines—roses, honeysuckles, or trumpet creepers. When the term vine is used, however, one usually pictures one of the latter mentioned woody types. Such woody perennial forms may be called by that fascinating term "liana". Lianas bring to the mind a picture of luxuriant jungles—impenetrable, living, the home of queer creatures impelling exploration. The word liana originated in the French Antilles and is now a component of most languages. The term is meant to include only woody perennial-stemmed climbing plants, hence occludes such herbaceous types as are represented by many of our climbing annuals.

The tropic jungles truly are the homes of vines. Here lianas reach their greatest variety and numbers. Although in our temperate regions we can account for only about 200 species of woody vines, the tropics can expand that number by adding another 2000 species for our enjoyment. The old botanist, Kerner, has best pictured "Liana-Land." He writes:

"This is the true and proper home of the liane. Everything climbs, winds, and twines with everything else, and the eye in vain attempts to ascertain which stems, which foliage, which flowers and fruits, belong to which. . . . They stretch in luxuriant festoons from bough to bough and from tree to tree, forming suspension bridges, even actual arcades with pointed and rounded arches. Isolated treetrunks are transformed into emerald pillars by the covering of woven lianes, or more frequently become the centers of green pyramids over the summit of which the crown spreads out in verdant plumes. Where the lianes have grown old with the trees on which they cling, and the older portions of their stems have been long stripped of foliage, they resemble ropes stretched between the ground and the tree-summits, and often assume peculiar and characteristic forms. Sometimes drawn out tightly, sometimes limp and swaying, they rise up from the undergrowth of the forest ground, and become entangled and lost far above among the boughs. Many are twisted like the strands of a cable, others are wound like a corkscrew; and others again are flattened like ribbons, hollowed in pits, or shaped into elegant steps—the celebrated monkey-ladders."

What is the secret of a climbing plant's success? Why should certain plants have a faculty of climbing while their neighbors on the woodland floor have to be satisfied with an uneventful existence in the "cellar" of the forest? Let us take a look at some of our climbing forms. Like every other plant they possess certain organs, those most familiar to us being known as root, stem, leaf, and flower. Not much variety when compared to the many organs of the animal body, but still sufficient for the demands of a green sedentary existence. Modifications of these four organs enable many plants to climb. These

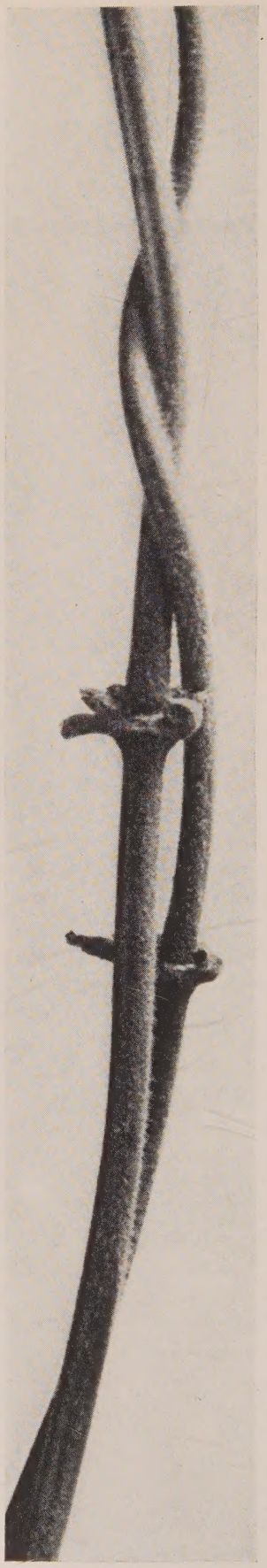
modifications take a number of different though common types.

Most familiar of all these plant acrobatic forms is the climbing stem; the most familiar trick is to climb—a stunt that has won for such plants the term "twiner". Hop, honeysuckle, scarlet-runner bean, Dutchman's pipe, morning glory—the whole galaxy—are good examples of twiners.

Twiners behave like normal seedlings in beginning life upright. Soon, however, in the course of their existence, they get the climbing urge. The tender growing tip becomes much elongated and soon the flexuous upper portion begins to sway ever so slowly, taking the path of an eclipse or circle, seeking—seeking—ever seeking in this beginning struggle to clamber. The movements, at times irregular, sometimes regular, are called "nutations". When a complete ellipse or circular path is finished the plant has described a motion known as a circumnutation—literally a completed circuit. With such maneuvers the plant feels about for the support on which it is dependent for growth. The rotatory movement is, for plants, rather rapid. It has been measured for various species. The hop, *Humulus lupulus,* makes the circuit in two hours and eight minutes, while a Japanese vine, *Akebia quinata,* describes the same nutation in one hour and thirty-eight minutes.

If a carriage whip is snapped against a horizontal bar its tip will coil around the bar and be anchored to it in a spiral fashion. In the same way the tip of a climbing stem twists around any support which is presented and soon finds itself spiraling upwards into the sunlight. Suppose that, however, in this first search, no support is found. The growing stem stretching upwards soon becomes too heavy, and is laid on the ground prostrate. In this position the tip extends for a short distance away from the area of its first climbing attempt and then begins again to spiral upwards. Such persistence is usually rewarded, and although the actual meeting of a nutating stem with its support must be considered accidental, still the movements described certainly must facilitate that meeting.

As soon as an erect support of suitable diameter is touched, the twiner begins to hoist its tortuous climbing coils. This may follow one of two directions, depending upon the particular climbing species. The coiling stem of the honeysuckle, *Lonicera,* is proceeding east, then south, and finally west—a motion sometimes described as clockwise. Such a climber is known as a dextrorse or right-turning climber. The hop vine and certain of our polygonums are also dextrorse climbers. Opposed to this type is the sinistrorse, or left-turning climber, which twists its nutating stem from east to north and then west in a counter-clockwise motion. The scarlet runner bean, *Phasaeolus multiflorus,* the Dutchman's pipe, *Aristolochia sipho,* and morning glories, *Ipomaea,* illustrate this type. The character of being "right- or left-handed" in climbing is evidently an innate-inherited character, for no amount of influence, either by light, heat, humidity, or physical compulsion, can change the nature of a given species.



. . . THE COILING STEM OF THE HONEYSUCKLE IS PROCEEDING CLOCKWISE—A DEXTRORSE CLIMBER.

In our temperate latitudes, twiners are usually annuals. In the tropics perennials the usual rule, and their encircling coils annually increase in size, the result being closely-knit and cork-bearing coils that often strangle their supporting host. Interesting modifications are often found as aids to twiners. The corky ridges on the stems of perennial twiners form a medium cementing the union of guest and host. Other attachment aids of the stem take the form of hooks, bristles, or retrorse hairs. Frequently the plant twists its stem as it spirals—this twisting brings about a stiffening torsion, which enables the particular species to become more closely applied to its support—just as the zigzag reverse tread of an automobile tire enables it better to hold the road.

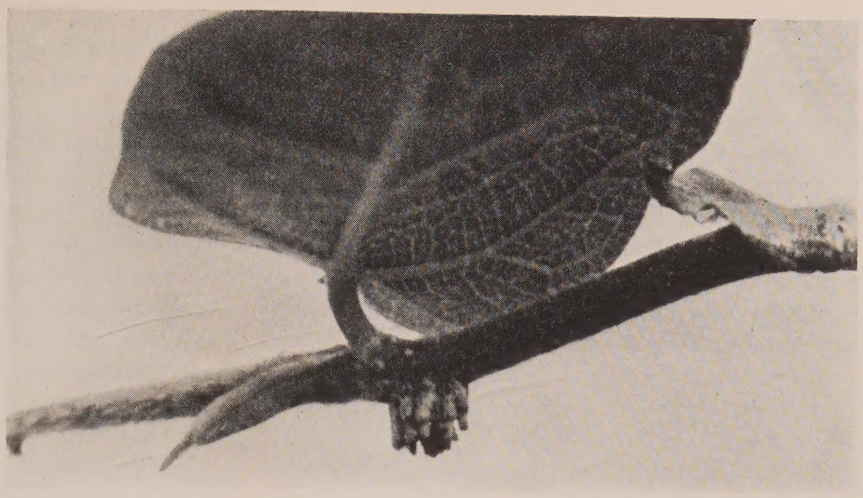
Highest though they are—in the category of vines—twiners yet are limited in their climbing proclivities. They cannot, for instance, throw coils around the flat face of a wall, nor can they circumnavigate trunks of large trees. They are limited to upright supports of rather small and regular diameter.

We do find vines climbing sheer walls and large tree trunks. These are usually acrobatic scramblers. Their main axis or stem does not twine, and indeed, there is no need for such action, for their bag of tricks is filled with a number of peculiar modifications.

First on the program is the climbing root. The normal place of the root is in the soil; the normal function is to absorb from the soil raw materials for growth. Special roots that spring from

the stems of plants to attach them to trees or walls are not, however, uncommon. The familiar apple tree often becomes a ladder for the poison ivy, which climbs it by means of such roots. The English ivy and the trumpet creeper easily scramble up walls aided by these special aerial roots.

Adventitious roots, as they are called, always appear on the side of the stem away from the light. Sometimes found distributed irregularly along the whole climbing surface of the stem as in the English ivy, they at other times become localized as in the climbing fig, *Ficus pumila,* and appear only on the side of the stem opposite a leaf, there secure from the drying influence of too much sunlight. Though frequently irregularly grouped, they also appear in parallel rows as tiny papillae which, when elongated, apply themselves to the surface of their natural ladder and flow over all the inequalities of the substratum, extending like tiny fingers into the crevices and crannies to form footholes that seldom let go. Those roots that fail to reach the support they seek either dry up completely, as in the climbing fig or, elongated, hang beard-like as from the stem of an English ivy. In the tropics, climbing roots, like twiners, often encircle living trees. Fusion of many of these roots forms encasing lattices which sometimes cause the strangulation of the tree.



". . . IN THE CLIMBING FIG, ADVENTITIOUS ROOTS APPEAR ONLY ON THE SIDE OF THE STEM OPPOSITE A LEAF, THERE SECURE FROM THE DRYING INFLUENCE OF TOO MUCH SUNLIGHT."

Some plants' best trick for getting weak stems into the air is the use of the tendril. These take several forms, similar only in that each is a coiling filament whose primary purpose is attachment. Tendrils are peculiar organs. The very word connotes something tender—sensitive. They are all of that. In their youth they are outstretched—uncoiled—like mendicant hands waiting for something to clasp. Undisturbed are they by the buffeting of rain drops and indeed, a vaseline-covered glass rod rubbed upon them will not even evoke motion. Let them, however, be stimulated merely by the touch of the rough or uneven surface of a solid body and they wrap themselves about it with a proportional strength if not the quickness of a constricting snake. That portion of the tendril not directly attached also throws itself into coils, and in so doing forms a sort of spring suspension mechanism for the climbing stem. Thus in violent winds the climber is insured against dangerous abrasions or falls from the breaking of tendrils, for these coils hold the plant firm at all times yet "give" or "take up slack" when needed.

It is not unusual for a tendril to fail to find a place of attachment, and when this happens it uselessly forms a coil around empty space. The photograph of *Passiflora edulis* shows three such branch-tendrils that will never aid that particular branch. Coils of this sort grow no further, and as the weeks go by they gradually shrivel up, die, and then, emaciated, drop like so many autumn leaves.

Leaves often assume the work of tendrils. As we well know, a typical simple leaf is composed of a broad flat portion, the blade, to which is attached the leaf stalk or petiole. Each of these two main leaf divisions at times aids plants to climb. Climbing nasturtiums wrap their petioles around a support and thus lift themselves upward. In doing so, their form is unchanged. They are not true tendrils. The latter are frequently formed by portions of the leaf blade. Gloriosa, one of our loveliest climbing lilies, pulls itself up by the extended tips of its leaf blades that become elongated into true tendrils and wind around supports. The sweet pea ascends a wire trellis in a similar fashion. In this case, however, it is not the blade of the leaf that climbs but rather the midribs, the sole remnants of what were formerly good flattened blades. The leaf of the sweet pea is compound, composed of five to seven leaflets. One can easily see upon looking at the leaf that only the basal leaflets remain in their original flattened shape, for the terminal ones have lost their blades to form, from the midribs, coiling tendrils.

All tendrils are not formed by leaves. Lateral axes frequently function as tendrils, and when they do they are spoken of as branch tendrils, for they are really nothing but modified branches. This type is the longest and perhaps the most efficient of the tendril group. They can best be seen in the tropical passion-flowers and in certain gourds. One of the latter, *Cucurbita pepo,* has a tendril that attains a length of thirty centimeters.

Most interesting of all climbing mechanisms are the tiny branching tendrils of certain members of the grape family. If we examine the young growing shoot of a Boston ivy, *Psedera tricuspidata,* as it progresses up the side of a brick building, we will see many lateral branching organs with tiny swollen knobs at their tips. As the days progress, these will be seen to approach the brickwork, apply themselves to the rough surface, and, flattening out like so many tiny suction discs, form a cementing union

between the climbing stem and its support. This organ looks like a miniature bunch of grapes. Botanists believe it to be just that—a tiny cluster of fruits that has evolved into a climbing organ called a cirrhus. So tightly does it cling that it will break before releasing its hold.

A slight variation in a cirrhus type can be seen in another member of the same genus, *Psedera inserta.* The young growing tips of this ivy's cirrhus penetrate the many small crannies abounding in the mortar of brickwork, and once in, swell up to mold themselves to the inner contours of their cavities. If the surrounding rock is dissolved by chemical means, the enlarged cirrhus tips will be found to be impressed with every tiny mark of the enclosing surface, "much as sealing-wax would be if it had been forced when fluid into the crevice".

A survey of the varied methods by which vines carry on the acrobatic feat of ascension shows that in the plant kingdom we have each one of the four main plant organs changed over from its normal function to that of climbing. Roots sometimes enable a plant to climb, as do also the stems of twiners. Leaves lift up their vegetable burden by means of tendrils, and tiny flower clusters mature their fruits into adhesive discs like the toe-pads of so many tiny tree frogs.

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A MUSKRAT EXPERIENCE

By HARRY L. CROCKETT

A RHYTHMIC *crunch, crunch* came to me as I sat quietly on the river bank. I turned to see ripples starting on the water just beyond a willow. There followed a slight splash and then the rotary *crunch, crunch* started again. This time I was able to see the bright, black eyes and the wet fur of a muskrat as it came up under the grass and plants at the edge of the bank. He helped himself to a clump of the plants and turned back into the shallow water to eat.

When he changed his position again he was about six feet in front of me, where he continued to gather small clumps of grass, roots and all, always turning back into the water, where he could keep the food submerged as he ate.

After about twenty minutes of continuous crunching, broken only by splashes when he changed position or gathered a new bunch of food, I took a picture. The click of the shutter did not bother him but the ratchet on the film transfer was apparently too much, for he took a couple of good sniffs, decided there was more than a shadow on the bank, and quietly slipped out through the clear water to disappear in the shadow of a willow on the other side of the river.

IT'S IMPOLITE TO DISTURB ONE AT DINNER

The author's clicking camera didn't bother this muskrat, but the noise of the ratchet on the film transfer was a bit too much

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Dust Storm

By RUTH SEYMOUR VESELY

This is a world grown menacing, and strange:
Our prairies turned to ridgy seas of sand,
Our cattle smothered on the open range,
Our people ghosts upon a darkened land.

We breathe as through a suffocating veil
That tastes against the teeth, and dims the eye
As reckless devil-winds of April flail
Our fertile topsoil hard against the sky.

It filters down and kills the budding wheat;
It filters down, and kills the buffalo grass.
What will be left for man and beast to eat?
What have we done, that this should come to pass?

The wheat is lost, but we can plant our corn
Should moisture come at once, and come again.
With hope alive, the burden can be borne.
Dear Lord, be merciful, and send us rain!

Bird Calling as a Hobby

By UNCAS M. McGUIRE

Illustrations by R. Bruce Horsfall

MUCH bird knowledge can be gained and much fun experienced by one who will take the time to learn a few simple bird calls. One who can entice birds to come within a few feet of him will find his bird world much enriched and will discover in his new accomplishment a mastery over birds that will yield him much increased pleasure in his hours spent afield.

One general distress call known as a kissing sound has been widely used and described, and there are some individual bird calls that some people have mastered, with which they can easily induce the birds to seek out its source. In addition to these there is another call, a general purpose call which I have not seen described. I discovered it more than three years ago, and have since been working to perfect it. It has a distinct advantage over the distress or kissing sound in that it seems equally potent in all seasons. The kissing call is most efficacious during the nesting period while not so effective at other times of the year. I have successfully employed this call to toll up to within a short distance no less than thirty-two different species of birds. The list follows: tufted titmouse, black-capped chickadee, blue jay, song sparrow, tree sparrow, fox sparrow, slate-colored junco, white-crowned sparrow, white-throated sparrow, Harris sparrow, lark sparrow, vesper sparrow, swamp sparrow, field sparrow, Savannah sparrow, chipping sparrow, Lincoln's sparrow, towhee, indigo bunting, cardinal, American goldfinch, yellow-breasted chat, brown thrasher, blue-gray gnatcatcher, northern yellow-throat, red-eyed vireo, warbling vireo, American redstart, house wren, Bewick's wren, ruby-crowned kinglet, golden-crowned kinglet.

If the call is to work its best, the day should be still and the would-be toller should be at least partly hidden, and remain perfectly still. To be concealed is really necessary when one is trying to toll up some of the shyer species, although gnatcatchers, kinglets, chickadees, goldfinches, and tree sparrows will often effect a six foot approach when the caller remains in the open.

Too much should not be expected from the call, however. Do not expect the birds to fly down and try to peck your eyes out—they won't.

There are several important uses of the call. It brings many possibilities to the photographer, and is often the means of bringing to view a rare warbler or secretive sparrow; to the individual who is taking a bird census, it is an indispensible instrument. I remember well how this was proven when I once estimated the number of juncoes upon an almost barren hillside as about fifteen. I tried the call a few times and no less than fifty or sixty appeared. The calling method is much to be preferred to flushing tactics when taking a census. The latter method will cause birds to take wing before you see them, or else they will slink about the brush or grass unobserved.

Methods of attracting birds within close range are of considerable interest to ornithologists. As the author says, the call generally known as the "kissing" sound is capable of wide application. In general an expert performer need not be surprised if he brings in any small bird that has a nest or young nearby, or any flesh-eating species. Thus, in addition to these here mentioned many experienced field ornithologists could extend the list of birds actually called to include practically all of our smaller species, sparrows, buntings, grosbeaks, warblers, thrushes, flycatchers, vireos, shrikes, swallows, wrens, thrashers, woodpeckers, nuthatches, orioles, blackbirds, besides the terns, gulls, rails, shorebirds, grouse, quail, vultures, hawks and owls, and an occasional individual bird of several other groups.

Parental solicitude, fear of a common enemy, the prospect of food, and mere curiosity are among the motives that seem to operate. These same emotions are inherent in the mammal make-up and result in responses from chipmunks, squirrels, marmots, rabbits, wood rats, and a host of small carnivores from wolves down to weasels. We have never actually summoned a bear or a mountain lion, but on a few occasions, when ill-prepared to meet them, have feared that we might.

This particular call is a whistle, but whereas most imitation whistles rely on the contour of the lips, this "summons call" depends upon the teeth for its rendition. The sound is not an exact imitation of any bird call but it does resemble the continuous scolding or the hissing of discovery one hears from a wren. A friend of mine who learned to produce the call aptly described its rendition as "a fine, thin see, see, see, whistled through the teeth". For some, to whom the performance will seem easy, this description will suffice, but for those who desire a more detailed account of the technique the following instructions are given.

Close mouth, open lips (any position) and hiss through teeth. Now open the mouth so the teeth will be slightly apart. Be sure to keep the tongue away from the teeth. A continuous hissing or whistling sound can be gotten that resembles the wind blowing through a keyhole. When you can reproduce this, you have the right mouth and proper set of the teeth for making the call. (Even people with false teeth can do it.) Now break up this continuous

THE MARYLAND YELLOW-THROAT PEERS CURIOUSLY FROM HIS REEDY HOME IN RESPONSE TO ONE'S CALL

keyhole sound into a series of syllables, jerks or units delivered in one breath. The first few "syllables" should be rendered in a fast, enthusiastic manner, the cadence being allowed to fall off and the syllables to lengthen progressively toward the end of the series. The scheme may be represented thus: — —— ———! The longest syllable expressed should be given only a fraction-second duration, while the first ones are jerked out as rapidly as possible. They should be pitched in a high key and delivered in as excited and animated a tone as possible. The call does not need much volume. The distance at which birds will pick up the sound is surprising.

Delivery can be made with something of the intonation and characteristic fervor of a chickadee's or titmouse's call *chickadee—dee—dee—dee—dee—dee,* or the call of a scolding wren upon discovering a snake.

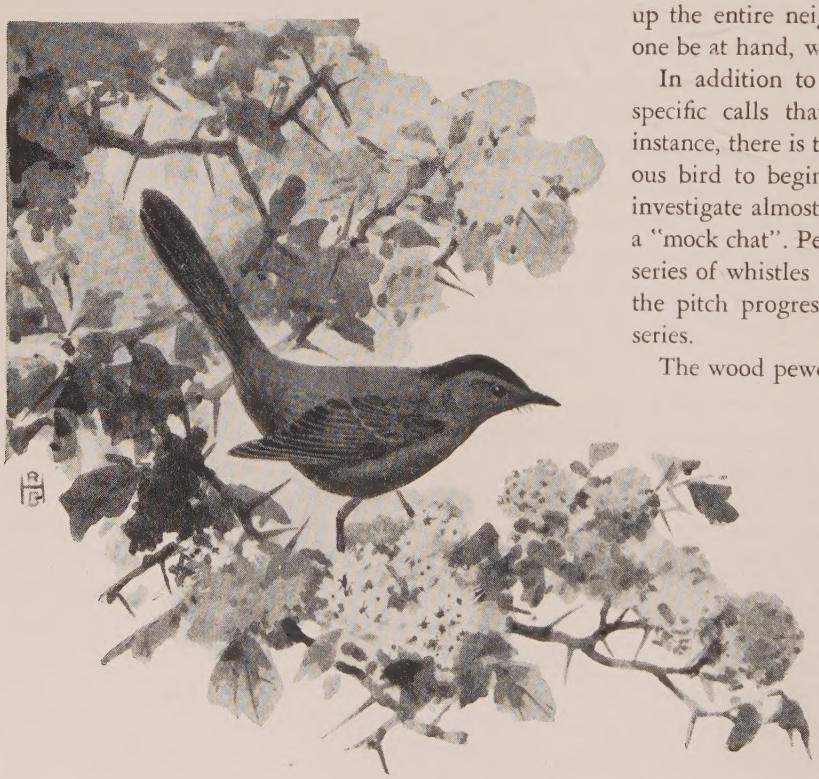
Dr. A. A. Allen in his *Book of Bird Life* tells of using the kissing call to coax together a large number of birds. He also says that by whistling the proper calls one can bring up the chickadee, wood pewee, field sparrow, white-throated sparrow and Baltimore oriole. Gene Stratton Porter in her book *Homing with the Birds* also writes of using the distress call or kissing sound.

A word about how the distress signal or kissing call is made may not be amiss. One of the best ways is to loudly kiss a finger, or the palm of the hand, making quick short successive sounds resembling the distress notes that one will hear from a young bird when it is pulled from the nest or taken into the hand. One can evoke the same vocal effect from an old bird in the hand, without injuring it, by taking hold of one wing and stretching it out.

The two general calls just discussed can be used interchangeably with one another to heighten the effect. A third call, the wail of the screech owl described in literature as a lure for various birds, can be added. With a combination of the three one can be assured of bringing up the entire neighborhood of birds. A stuffed owl, if one be at hand, will certainly add to the excitement also.

In addition to the two general calls there are some specific calls that will work with specific birds. For instance, there is the yellow-breasted chat, which is a curious bird to begin with, and which will be induced to investigate almost any of the whistles and notes given in a "mock chat". Perhaps the most charming for him is the series of whistles in which the cadence lengthens out and the pitch progressively falls off toward the end of the series.

The wood pewee is sometimes brought much closer, as if it were seeking company in its misery, when one gives an imitation of its sad voice. The chickadee responds to a two-syllabled whistle that in my system of personal phonetics sounds like *knee-deep! knee-deep!* The tufted titmouse likewise reacts to a call



THE CATBIRD IS SO INQUISITIVE ABOUT STRANGE SOUNDS THAT HE USUALLY COMES PELL-MELL TO ANY CALL

that is quite plainly whistled as *Peter, Peter.* A robin will make much ado over a set of scolding *thief, thief* calls that can be made by the tongue, teeth and lips, aided by a high pitched voice. Blue jays decoy for a sharp imitation cry of *stee! stee! stee!* the call that marks a jay's excitement upon some new discovery. The crow is similarly brought up by an imitation caw. The killdeer will respond to a likeness of its own name; only *killdee* is better to use than *killdeer* and it can be given to perfection in a thin high pitched voice. Bobwhites, after being scattered, can be summoned together by a whistled rendition of the covey call. This is not the bobwhite's usual call but is a whistled *whert-chee.* You have to approach the scattered birds for this however; otherwise the only results you will secure are a few answers to your calls, for after the birds have come together their calls will cease. In the spring and summer sometimes individual birds will come for a bobwhite whistle. By giving a red-tailed hawk's scream, either by voice or whistled through the teeth, I have been able to gain a small degree of attention from these birds, although none have as yet approached me very closely. I have also been told that the imitated call of a bobwhite will attract some hawks. I do not know what species or whether it will work for sure at all I cannot say. It sounds plausible and that is my reason for mentioning it. Owls too, recognize and respond to their language. The screech owl is enticed very near sometimes by an imitation of its cry. The barred owl is no less attentive to one whose voice sounds like barred owl to him, and the wary great horned owl can be outwitted by a few emphatic, well-delivered, sonorous hoots. I have had these big birds come within a fishing pole's length of me while I called. The whip-poor-will has also come to me while I sat in the moonlight and whistled its name.

THE DAINTY BLUE-GRAY GNATCATCHER WILL SOMETIMES COME TO A CALLER WHO IS IN PLAIN SIGHT

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A WEED

By LELA M. GIBBS

I am a Weed. Therefore I do not have the care
Of loving hands to tend my needs.
The earth from which I spring is thrice begrudged
And oftentimes is shook from off my roots
With ruthless hand.
I am cut down
And either trod or burned
Until my presence here becomes a thing of dust or ash,
And yet,
I spring anew.

For He who giveth life has planted deep within my soul
A zeal to live again,
And buried close in tender wrap of seed, is found
A spark to light again in spring.
And covered by the snow of wintertime, I sleep and rest.
Then, at the call of Him who plans the cycle of the year,
And gives to me the dew, the rain, the warm embrace of sun,
I live again.

I do not mean to rob the beauty of a bud or bloom
But oftentimes I know they die.
For in the urge to recreate
In selfishness, I take the best of earth.
In recompense, I give to beast and bird
Their daily food. They welcome me with joyousness
Of bleat and song, and oftentimes,
Within my very arms, their young are born.

Perchance the wind, who carried me afar
In fall, from out the holding of my mother stalk
Has taken me afield;
Or being low in spirit he himself;
Has left me all alone
Beside a concrete ribbon road that winds through
Bleak and dreary vale.

I do not sulk, and say "I will not grow"
But, rather, lift my hungry arms to Him who
Gavest me my life, and only pray—
As from the mother earth I suck
The sustenance she gives so generously
That I may bud, and bloom in beauty as my measure holds,
And then, to give full birth again
To Weeds.

CONGO BONGO

By ATTILIO GATTI

Photographs by the Author

BEYOND any doubt, the bongo is the rarest and most elusive of all the animals in the Kibali-Ituri forests of the Belgian Congo. Only two of them ever have been seen in captivity—one each in the New York and the Rome zoos. Both of these individuals belong to the Kenya race. Of the other three races, although several expeditions have tried their hand at it, not one specimen had been captured prior to our fortunate search that began in April, 1934. It was a long search, for it was not until August 24, 1935, that we captured our first bongo, an individual of the Haut Uele, Belgian Congo, race, *Boocercus eurycerus cooperi.*

H'rabi, as the pygmies christened her, stood 23 inches high at the shoulder at the time of her capture, and the men

H'RABI SOON BECAME ONE OF THE FAMILY
Shy and frightened at first, she kept to herself at the end of her corral, but in a few days she was eating from the author's hand like any well-mannered pet

unanimously declared that a female of that height could not be less than nine or more than ten months old. She was badly frightened at first, but, small as she was, when we attempted to lift her into one of our trucks she nearly bolted out of our hands, and, kicking with the force of a powerful spring, knocked two men to the ground. Later, however, after H'rabi had been kept at our camp for some months, we came to the conclusion that the bongo, if captured when young, immediately adapts itself to captivity and man's food, develops an excellent disposition, a philosophical attitude, and a quick intelligence that one would not expect to find in an antelope.

H'rabi quickly became accustomed to her corral, and she divided her time in the most sensible way. Early in the morning, as soon as the door to the large mud hut was open, she would run out and eat all she could before the sun became warm. Then she would lie down in a shadowy corner to ruminate until it became too hot, when the coolness of the room appealed to her. There she would alternately eat and sleep, always ready to catch the smallest sound with her huge, never-resting ears, and to run to the door if any of us appeared. Her corral originally included a patch of sweet potatoes and native vegetation, but I was forced to cut the latter in half as I noticed that as

PUZZLE: FIND H'RABI

The bongo's markings blended so well with the tropical vegetation that at times we had trouble finding her in the undergrowth of her corral

soon as she ate some of the forest leaves she became restless and nervous, justifying the wise words of an old native hunter: "*N'kenge* eats wild food, she becomes wild; *N'kenge* eats the food of the *Bwana,* she becomes *Bwana's* animal." *N'kenge* is a native name for the bongo; others are *Sori, Bangana* and *H'rabi.*

H'rabi was particularly fond of warm milk, and she drank it from a deep plate as if she had never had it any other way. The first time I fed her, fearing that she might get indigestion if she drank too much at one time, I walked slowly around in a circle before pouring out another small quantity. She immediately learned the trick, and from that time on, without my moving, she always made a complete tour around me before again approaching the plate. A sip, a tour; a sip, a tour; and always from left to right. When she made a mistake in the direction, I merely had to wait before pouring out more milk; then she understood and went back to the correct side.

A BONGO BEGGAR

After nuzzling and coaxing the best she knew how, she played her trump card, a plaintive "baa"

It was interesting to compare H'rabi with Doreen, the bongo at the Bronx Zoo. Doreen, at the time of capture the same age and stature as our bongo, had quite long horns; H'rabi, none at all. According to the natives, the female bongo of the Kibali-Ituri and the Haut Uele sometimes has horns that are much smaller than those of the male, but most often no horns at all. This information may or may not be exact. It is a fact, at any rate, that H'rabi, too, has now developed horns, shorter and very much larger than those of Doreen. The front line of the head, straight in Doreen, in H'rabi is strongly convex, because of a thick reinforcement of bone between the eyes that is similar in form and probably in use to the bony plate that enables the okapi to use its head as a formidable battering-ram. H'rabi's ears are much larger than Doreen's and their white markings are much more abundant and vivid. The same is true for the oval white markings on both sides of the head.

One would say, to look at a bongo, that its beautiful chestnut-red coat, the numerous white stripes on its sides, and the other distinctive markings would cause it to be easily seen against the green, black and gray background of the forest and the great boles of the trees. On the contrary, however, the coat of the bongo is such a perfect example

of mimesis with the lights and shadows, forms and colors of the forest that it is no wonder that the natives believe the animal has the power to pass at will from the animal to the floral kingdom. In fact, we often had to spend several minutes looking for her when she secluded herself in the few square yards of forest vegetation included in her corral. At times, she remained so immobile that I was able to take long-exposure photographs of her that turned out excellently despite the bad light. In many cases, I could not find H'rabi on the negative, and had to wait for the positive before I could discover her position.

Now that H'rabi has made herself at home in the Rome Zoological Garden, she is losing this instinct of concealment, evidently imposed on her race by that world of fear that is the forest. Now, pacified by her new happy life, she will soon forget completely the black shapes of hunting pygmies, the horror of equatorial storms and the terror of poisonous snakes and leopards.

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The Red Maple Scores a Victory

By H. L. BAILEY

WHETHER or not a man should be loved for the enemies he makes, certainly a tree may be loved, or at least valued, for the enemies it does not have, especially when the tree is one so handsome as the red maple, and the enemy it does not have is so great a miscreant as the forest tent caterpillar.

Long rated as a sort of poor relation, particularly where its haughtier cousins, the sugar or rock maples, predominate, *Acer rubrum,* the red, white or soft maple, now has its opportunity to lord it over the others of its family. For when it is considered that in Vermont, New Hampshire, northern New York and other sections of the northeast, thousands of acres of sugar maple woodland and hundreds of miles of street trees were last year defoliated by the forest tent caterpillar, and that such outbreaks may be counted on at fairly regular intervals 15 to 20 years apart, immunity from the insect's attacks is something worth noting. The red maple apparently has this immunity. In Vermont, case after case was observed this year where trees of that species stood unscathed amid sugar maples whose foliage was completely riddled by the caterpillars.

When a resident of the sugar maple belt, particularly a Vermonter, makes a mistake, it usually isn't one concerned with maples. He has played and walked in their shade, lumbered and hunted among them or worked at making sugar from them, and he has been brought up on the sweets from their sap. Looking at it from the utilitarian standpoint he naturally rates the sugar maple above all others. Consequently he would not think of planting a red maple even as a shade or an ornamental tree. Accidents will happen, though, even when north country folks plant their young maples. Hence, now and again, in the rows of maples lining so many Vermont and other northern village streets, a tree blossoms out in brilliant red flowers in spring, turns to more glorious hues than its neighbors in the early fall and, as we now know, keeps its full dark green foliage when all the rest about it have been despoiled by those non-stop marathon eaters that

RED MAPLES SURPRISE VERMONTERS

Planted by mistake, these trees are immune to the tent caterpillars that have defoliated the sugar maples growing beside them

scientific works call *Malacosoma disstria.* These trees are red maples set by mistake; or shall we say by misapprehension, for perhaps it was not a mistake after all. Perhaps, with its greater beauty in spring, its freedom from attack by the caterpillars, and from that other serious enemy of the hard maple, the sugar maple borer, and the fact that its sap does make a fair grade of sugar, if one is thinking of that, the mistake was not in selecting one red maple and ninety and nine of the more popular sugar-producing species, but in not reversing the proportion.

Pymatuning Swamp—Wildlife Haven

By N. R. CASILLO

IN THE language of the Delaware Indians, Pymatuning meant "the crooked mouthed man's dwelling place." Now, however, to the thousands of waterfowl and other birds that frequent it, it signifies food, rest and protection.

The inundation of the immense Pymatuning marshes, on the Pennsylvania-Ohio line eighty miles north of Pittsburgh, marks a forward step in the annals of conservation. For once, industrial and political interests have respected the rights and wishes of the champions of Nature. Not only has the primary objective of the project been attained, i.e., to insure an adequate water supply for the industries in the Shenango River valley, but it has also resulted in creating conditions that are ideal for the conservation of the varied wildlife of the region. It attracts birds of forests and waters.

LEFT AS NATURE PLANNED IT

Unspoiled by commercialism and industry, this island is one of many in the Pymatuning area frequented by interesting wildfowl

The lake that now stretches from Jamestown north to Linesville, Pennsylvania, has a shoreline of more than seventy miles and a length of sixteen. Thus it approximates in size Chautauqua Lake in New York.

A highway from the Ohio line to Linesville separates the main lake from a smaller and more shallow piece of water, which the state of Pennsylvania has set aside as a waterfowl and songbird sanctuary. The east and north shores of the upper lake, as well as much of the large lake, are surrounded by thousands of acres of marshland spotted with many wooded islands rising above the general level. Some 3700 acres of both land and water comprise the area of the refuge proper.

Long before the completion of the undertaking, it was predicted by many sportsmen that the district would eventually become the finest duck-shooting territory between the Illinois River and the Atlantic seaboard.

And, surely enough, the lakes and the adjacent marshes have become meccas for many thousands of ducks. Yet the shooting is negligible. This is because the waterfowl take refuge in the upper lake and marshes promptly upon the opening of the shooting season. It is truly amazing to view hundreds of ducks within the sanctuary, while the lake, just across the causeway, is practically devoid of the birds. Ducks in the refuge that will eat from one's hand are as wild as hawks when outside of its borders.

Parts of the vast swampland comprising the refuge seldom have been penetrated by man. It is so wild that it is still frequented by numbers of pileated woodpeckers, and many of the watercourses still know the touch of the wood duck's breast. Birds nest here that do so nowhere else in the North Atlantic states. This has been verified by no less an authority than George Miksch Sutton, who has written a book on the birds of Pymatuning. Actually, 244 bird species have been recorded in the swamp.

In early June the variety of bird songs and calls that can be heard is bewildering. Last year I penetrated one of the few accessible but little visited sections, just to listen to the varied chorus. The tote road that led into the heart of the swamp a few short years ago was completely obliterated. Shrubs, trees and lush grasses made such a tangle that I had to literally cut my way through.

Finally, however, I reached my objective, a small wooded hummock only a short distance from a traveled highway. In all directions stretched a chaotic jumble of rotted stumps, cattails, shrubby dogwoods; bogs surrounded by sphagnum moss, cranberries and swamp loosestrife. Here and there the flat monotony was relieved by outcroppings of wooded isles.

Duck language could be heard from every quarter; a restrained squabbling that bespoke of contented living, and furnished a suitable obbligato to the rich and mixed songs of many varieties of birds. Song sparrows by the score, cardinals by the dozen, and singles and doubles of many other songsters mingled their melodies with the staccato calls of the flickers. Frequently, the entire polyphony would be ruptured by the wild, siren-like scream of a pileated woodpecker as it careened through the trees at breakneck speed.

It was an experience to thrill any Nature lover. And here at Pymatuning is the miracle, a bird paradise in the

very center of a densely populated section of our country. A glance at a map will locate either Jamestown or Greenville, Pennsylvania, and show the close proximity of the large cities of Pittsburgh, Cleveland, Youngstown, New Castle and many others. Actually, it is in the center of an area teeming with millions of people. To be exact, 5,400,000 live within one hundred miles of the sanctuary.

Aside from the purely local aspect, the refuge has proved of inestimable value to all migratory bird species traveling to and from their nesting grounds, as it provides a feeding and resting place as well as protection. Obviously, this results in a greater number of birds being sent to their breeding grounds farther north.

It is my belief that the salvation of our ducks lies in the establishing of more such areas at strategic points along migratory routes; areas that give food and protection.

MALLARDS RESTING IN PYMATUNING SWAMP

These birds have become so tame from close association with Nature lovers that they will feed from the hand

The Glorified Cellar Hole

By HOWARD CLEAVES

PERCHED on the high west bank of the Potomac River not far from Harper's Ferry, Shepherdstown, West Virginia, is in a region rich in historic incident. An atmosphere of antiquity hangs about many of its buildings, which impress one as being appropriate to their surroundings.

The people there know how to use flowers and almost everyone grows them. We saw a man on his knees working in a tidy garden and were told he was blind. Although sightless for many years, he annually produces one of the best gardens in Shepherdstown, enjoying his flowers through the senses of touch and smell.

What impressed me most was the glorified cellar hole. Some years ago a fire destroyed a drug store on the main street of Shepherdstown, and for a long time the wreckage remained as an eyesore. Old automobile bodies were thrown into the pit to join charred timbers and twisted pipes. Then came Mr. and Mrs. H. O. Osbourn to the place next door. They put the magic touch on the old cellar, removing the debris and carting in top soil. In the past eight years they have transformed the spot into a beautiful sunken garden. People stop to look at it. Mr. Osbourn was pointed out to us as he sat whittling in the shade of a big tree, talking to some of his friends. Our questions about the sunken garden were answered with such quiet modesty that one would hardly suspect him of having had much to do with it.

Rambler roses were trained up the stone walls along

UNSIGHTLINESS UNWANTED IN SHEPHERDSTOWN

What was rapidly taking on the appearance of a city dump was transformed into a place of beauty by one resident of the community

with bittersweet. In front of them were placed hollyhocks, phlox and other tall stalwarts. Iris, coreopsis, bachelor buttons, pinks, snapdragons, bleeding hearts, lilies and roses were among others used, according to their merits, to transform the place. The effect of the whole was most satisfying. Drive down to Shepherdstown some time and see Mr. Osbourn's glorified cellar hole, a West Virginia contribution to the cause of neighborhood beautification.

STRAWBERRY TREE

By E. E. STANFORD

BEAUTY IS ITS OWN EXCUSE FOR BEING

The fruit of this tree is pleasing to the eye and, though not particularly delectable, its pulp might be so improved as to afford material for jelly or preserves

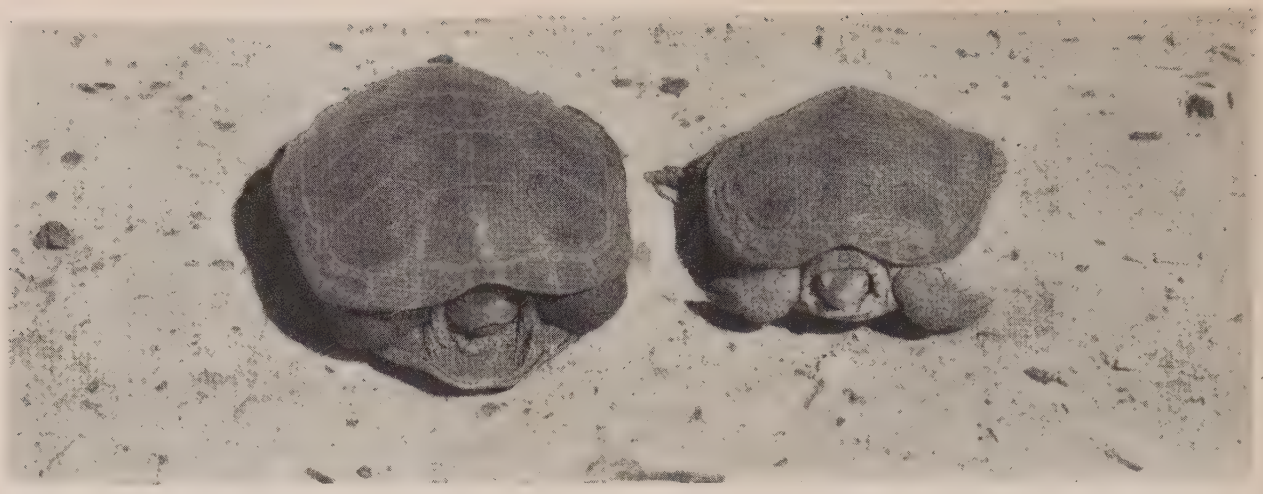
SOME of the finest superlatives in the language have been all but worked to death on the strawberry. Quotation has also worn threadbare the dictum of the sage who sought to sum all praise by saying that while the Lord doubtless might have made a better fruit than the strawberry, certainly the Lord never did.

Those who labor in strawberry fields have often conceived at least one improvement on the strawberry. It might, they say, better be borne on a bush or a tree. Thus its daintiness would be kept out of the dirt; there might be a larger yield per acre, and certainly arboreal habit would obviate that painful ache in the human back that now attends strawberry picking.

There is good news—at least, it sounds like good news—to strawberry pickers. There *is* a strawberry tree! To botanists it is known as *Arbutus unedo*. Sometimes it reaches a height of thirty feet, but generally in cultivation it is trained as a broad and spreading shrub of perhaps half that altitude. It is evergreen, with glossy saw-toothed dark green foliage, pale greenish white or sometimes rosy clustered bells of blossoms, and profuse globose roughened scarlet fruit almost an inch in diameter—whence, of course, the name is derived.

A strawberry tree in full fruit is one of the most strikingly beautiful of landscape shrubs. The flowers, like those of oranges, appear again before the fruit falls. But the conspicuous charm of the shrub is in the fruit itself. The globes are greenish at first; then change through a brilliant orange (which perhaps doesn't recommend the strawberry tree in southern Ireland, one place where it is native) to a clear deep strawberry red. Unfortunately, like many fall-flowering shrubs of southern Europe, the strawberry tree is not hardy, and can scarcely be recommended save in the southern states and on the Pacific coast.

The quality of the fruit? Ah, there, for the strawberry picker, is the rub. This strawberry-character, like many other similarities, is scarcely skin-deep. The tree is, in fact, no relative of the strawberry, but is close kin to the Pacific coast madrone, and so more distantly related to the blueberry, the huckleberry, and the cranberry. Inside the warty skin—which rasps the tongue more than a little—the pulp is orange colored, soft-jammy, and acid, with plenty of seeds. The fruit is not inedible; at least, I have never been poisoned by it. But I can find no praise of it in cookbooks, or in works on horticulture. It might, I should say, make fair preserves. However, in the words of the poet, beauty is its own excuse for being, and nobody owning so rare a shrub as the strawberry tree is likely to try to cook the product. Perhaps, in a more advanced future age, when fashion has demanded a wedding of the beautiful and the practical, some later Burbank may toughen the frost-sensitive fiber of the strawberry tree, and breed into its orange-scarlet fruit a flavor that will give the strawberry picker a chance to "look upward and not downward."



DIAMOND-BACKED TERRAPINS
Once commanding a high price, this species has been able to increase its numbers because of a decrease in the demand

SOUP PERSONIFIED

By IVAN R. TOMKINS

APRIL, in the winding salt-water creeks of this part of the country, brings the diamond-backed terrapin out from its winter in the mud at the head of the smaller creeks, and, as I go up and down in my bateau with an outboard motor, I can see heads pop up here and there to see what has made such a racket. This curiosity is well-known among the men who would net them for market. They take a net and circle the spot where a head has been seen, then rap on the gunwale of the boat with a stick, and as the little turtle lifts its head to look again, the net is tucked under it, and another goes into the boat, to be sent to the terrapin farm for breeding or canning or possibly to be sent to market alive.

Since earliest colonial times the diamond-back has been regarded as a food of excellent flavor, and during the champagne and canvasback duck era at the turn of the century, a female that was six or seven inches long, measured lengthwise of the plastron, or lower shell, might be worth five or six dollars. Nowadays, prices are not so high, and the evil days that have fallen on the industry have been a boon to the turtles themselves, as the lack of a market and lower prices have given them a chance to increase in numbers.

Most of the states now have laws against netting them during the laying season, the most rudimentary of good sense. Unfortunately, most of those who hunt them are darkies without much understanding of the reason for such things, and because they have always done it, think the law only a bother, something to be watched out for, but otherwise unexplainable. One old negro I knew was arrested by the local constable for "ketching cooter," and a lawyer at the county seat charged him a dollar for writing a letter concerning his appearance at court. He then came back and violated the law all summer on the strength of that letter. He just felt he had found some way in which the law did not apply, so went ahead.

One of the famous law-makers of a long time ago, when asked if he had given the people the best laws, said that he had given them the best they were able to understand. I think that conservationists, sportsmen, and even politicians, in the better sense of the word, might learn something from that simple statement. For if, after passage of laws that are biologically sound, we can prove to those involved that *these rules are wise* and that their best interests are served by obeying them, then the problem brings itself down to restraining only the utterly selfish ones. And the development of high standards of sportsmanship among both young and old, teaching them that the joy of the game lies in the game itself and not in the score, coupled with the wish to appear among others as the owner of those same high standards, will eventually still further reduce the group that must be dealt with more firmly. But we have gotten far away from turtles.

There is an island where no one lives, down below a maze of salt rivers and creeks, where the ebb tide carries the females down towards the sandy beach. Then, when the flood tide makes, they crawl out and over the sandy ridges back of the high water mark, there to dig holes and lay their eggs. This done, they cover the holes neatly, go back into the water, and up into the muddy marshes to live until the urge to lay eggs again comes upon them.

To this island, lonely to humans but vastly alive with many kinds of wildlife that perhaps are of equal importance in the scheme of things, I like to go, and before the morning wind has erased the markings on the sand, I trace out the record there displayed. There will be the meanderings of fiddlers, the trails of scavenger sand crabs, tracks of willet and plovers, the probings of sanderlings, and often the marks of the night-prowling raccoon or mink.

The sand is sometimes too hard for the terrapin, or perhaps there are roots or oystershells that prevent digging the nest hole, so that several attempts must be made before success is reached. Usually the marks lead from where they emerge from the water to the higher

places reached by the tide, then there will be loopings where it has been necessary to scramble over a low bank, then perhaps several trials to find suitable ground, but at last the tracks reveal where the nest is located. Dig into it, and there will be a soft place in the harder under-stratum and, about six inches below, the five to nine eggs, oblong, parchment covered, and with a dent in each, if fresh. After a few days they absorb moisture from the layer of damp sand, and plump out.

How the turtle knows that here is a suitable place to furnish the proper amount of moisture, ventilation and temperature for the three months it takes for the eggs to hatch, one cannot say. We must attribute it to that marvelous thing called instinct, usually the name given to those natural actions of animals that seem to have an unexplainable origin. Actually the effect of environment, the physical life and necessities of the present and past individuals of this line, have all contributed.

A DIAMOND-BACK'S NEST

The five to nine eggs are found about six inches below the harder under-stratum of the sandy beach, far out of reach of the highest tide

It sometimes seems to me that there is a hint of an unusual inheritance in this trait of an aquatic turtle coming out on land only to lay eggs in a satisfactory place for their hatching. Did its ancestors once live partly on land, and did later experiences modify this life to a nearly aquatic one? For even the ponderous loggerhead turtle of the sea, often weighing five hundred pounds, regularly comes ashore only to lay eggs, to return at once to the ocean. And this species even has the usual turtle feet and toes modified into swimming flippers. Certainly the egg-laying habit did not originate from intelligence alone, for such slight intellect as is shown necessarily developed long after the behavior pattern was operative. For along with the need of food to maintain life, the need for each to reproduce its own kind safely was the earliest, as it is the latest, primary need.

And so we find that even a turtle may have a heritage that is hidden in the cloudy and uncertain past. With this plodding and dull-brained tribe, as with the human race, some of the commonest actions may hark back to habits no longer operative, and now unsuspected.

STORIES IN THE SAND

The tell-tale footprints pictured here reveal the route taken by the female in her search to find a suitable place to lay her eggs

Once in a Lifetime

By A. FOEHL, JR.

THE CROWNED ANOLIS

This species normally measures about 20 inches in length. This specimen was taken somewhere in Cuba; its color varied from bright green to dark olive

FEW of us expect to find, and fewer really do find a new species among the vertebrates in these days of energetic search and research. And we would hardly expect to find something new among the fauna of a country that has been covered extensively by parties from the largest universities and museums. However, this is just what happened.

Specializing in reptiles and ever on the lookout for odd lizards we turned our efforts to the West Indies. A letter to a friend in Cuba brought an answer that he could obtain some "chameleones" for us. When one has had some experience in this line, he does not thrill at this word. Any lizard possessing the power to change its colors is popularly termed a chameleone in most of the Latin American countries. Here in the United States, we call a certain small lizard a "chameleon," although it is far removed from a true chameleon, and rightly should be termed the American green lizard or anolis. Scientifically it is *Anolis carolinensis.*

Six or seven weeks later we received a letter stating that a box of reptiles had been shipped, and our interest was aroused. The box followed in a few days—and what a surprise! Great big fellows, twenty inches or more in length, brilliant green; greener than any lizard we had ever seen. At first we did not think these queer specimens were *Anolis* but upon closer inspection decided that they were members of this genus. Looking further we found many curious points; the top of the head was quite bony and concave, the brow sharply defined. Along the edge of the brow there was a row of rough, hard tubercles, bright yellow in color. And what a mouth, a regular mouse trap with sharp rows of teeth. When handled the lizards distended an enormous throat pouch that when held to the light was a decided pink. The fact that it was pink is rather important.

In addition to the bright green color (it ranged to dark olive at times), there was a bright yellow patch running back over the shoulder. Along the sides were scattered white spots and on the tail these were more numerous. The scales were rather large, squarish, and plate-like. After a bit of study and checking we decided that they were *Anolis equestris,* the giant of a genus that contains more than a hundred species. Later on, to settle any doubt, this identification was checked by half a dozen technicians and found to be correct.

In the course of two weeks three eggs were laid. The lizards drank water avidly, and its effect was to make them more active and interested. They ate practically all insects offered, the succulent larvae of the wax moth, *Galleria mellonella,* being a favorite. Later they learned to take strips of beef and liver from a slender reed.

Now, with something like this to show all our friends, everybody wanted one or two, and before long we wrote for more "chameleones." This is where the curious part of the story begins. In this letter we asked our friend to get a goodly number. But he had other thoughts about collecting and delegated two other chaps to catch our specimens. It happened that these collectors worked different localities, and the result was two lots that we shall call *"Anolis equestris I"* and *"Anolis equestris II,"* number one being those received first.

We could learn from no book or other authority what *equestris II* was or why it was so different. At first glance these individuals really appeared to be "sick *equestris,*" as one person termed them, but after an acquaintance of a week or two, we noted many differences in appearance. A thorough check-up had proved that the first group was typical *Anolis equestris,* but all lists consulted, including Dr. Thomas Barbour's up-to-date *Cuban Reptiles,* leave out anything approaching *"equestris II."* A number of specimens were sent to an eminent biologist, who may have named them.

Here are the easily observed differences of the new form, in brief: Smaller and more "lizard-like" scales; yellow decorations rather dull, usually whitish. Along the lips the skin is bare and flesh-colored. The body colors are a shade darker throughout all variations; the white dots on flank and tail are generally absent. During sleep, when the green coloring is brightest, the new type is much duller than *equestris.* And last, but by no means least, the gular pouch is yellow with perhaps a tint of orange, when held to the light, but never pink. This difference is constant regardless of other variations between the two and should warrant calling this newcomer from Cuba the yellow-throated anolis.

Bravely blooming in a crystal setting of snow, this lovely flower is popularly known as "Christmas rose." It is, of course, not related to the roses, but is one of the hellebores, probably *Helleborus viridis*. It is from the roots of certain members of this genus that a number of poisonous glucosides are obtained, including helleboreine, which is used as a heart stimulant. The genus is widely distributed in Europe and Asia. The species shown is common to the eastern Alps, where it grows wild in the valleys, following the receding snow line upward as spring arrives. Often a late fall of snow leaves it for a short time as we see it here. It is naturalized in eastern North America, probably having escaped from cultivation. All pictures courtesy of Austrian State Tourist Department.

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FLOWERS OF AUSTRIA'S ALPS

In spring and early summer the valleys and slopes of the Alps of eastern Austria are vivid with the color of wild flowers. Nearly seven hundred species are found there, and of these nearly three hundred also are found in the region north of the Arctic Circle.

Many of these Arctic plants belong to groups that are circumpolar in range, their distribution dating back to early geological times when land connection in the north was continuous, or nearly so. Some of the species range southward along mountain chains for thousands of miles, and many also occur on isolated mountain-masses or even in certain lowland habitats, perhaps as a result of glacial movements. Thus we may find on the summits of our higher Appalachians, or Rockies, plants that Linnaeus first saw in Sweden or Lapland.

Varied are these flowers of the Austrian Alps, but

Favoring the scant soil of chalk cliffs and limestone ranges, *Hepatica triloba,* European cousin of our common American species, *Hepatica americana,* sends forth its dainty blue, rose or whitish flowers and its interesting leaves that have caused it to be widely known as liverleaf. In the Alps it is sometimes known as the windflower. It is found generally in Continental Europe and is one of those that has become adapted to an Alpine setting. It flowers in May and June.

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they share one common characteristic: that of adaptation to Alpine conditions. The edelweiss is one of the most distinctive of these plants, and is one of those that, with changing geological conditions, have retreated to the upper mountain reaches, there to prosper in what seem to be most inhospitable natural surroundings.

On many of the mountain slopes and in the Alpine valleys are found growing wild numerous species that have been introduced to distant lands, there to grace cultivated gardens. But here in Nature's garden, treeless, often rocky and sparse of soil, they possess a particular beauty by virtue of their native hardihood.

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The autumn crocus, *Colchicum autumnale,* is one of the most characteristic of the flowers of the eastern Alps. As its name suggests, it blooms in the fall of the year, flourishing regardless of heat and cold and extreme changes of temperature. Its lovely purple or white flowers are often found in double form. Its flowers are really stemless, opening atop a long tube that is actually a part of the flower itself.

The famous edelweiss, *Leontopodium alpinum,* is perhaps the most famous of all Alpine blooms. It ranges throughout the entire extent of the Alps, flowering in almost lonely grandeur at heights reached only by the more intrepid mountain climbers.

The edelweiss is sometimes called the cushion plant from its compact, moss-like growth. Its tufted and woolly covering may be one indication of its adaptation to a life of coldness and dryness. It flourishes in exposed places where gale-like winds seek to sweep it from its home, but it puts down strong and long roots to anchor it against the elements. Transplanted to a rock garden, it requires a gritty or sandy loam, a fact that reflects its hardy character.

The edelweiss is the symbol of the Alps and their inhabitants, and also is the flower symbol of several Alpine provinces, and the official flower of Switzerland.

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The mountain poppy or Alpine poppy, *Papaver alpinum,* grows on the upper slopes and is most common in the easternmost Austrian provinces. It has fragrant white or yellow flowers. It is comparatively stemless as poppies go, usually not growing higher than ten inches. It is known in its native region as "bergmohn." This poppy is related to several species of our American Arctic that are known collectively as Arctic poppies. They are extremely tolerant of cold, rearing aloft their seemingly fragile stems and flowers under conditions of frost and driving winds that would seem to insure instant destruction.

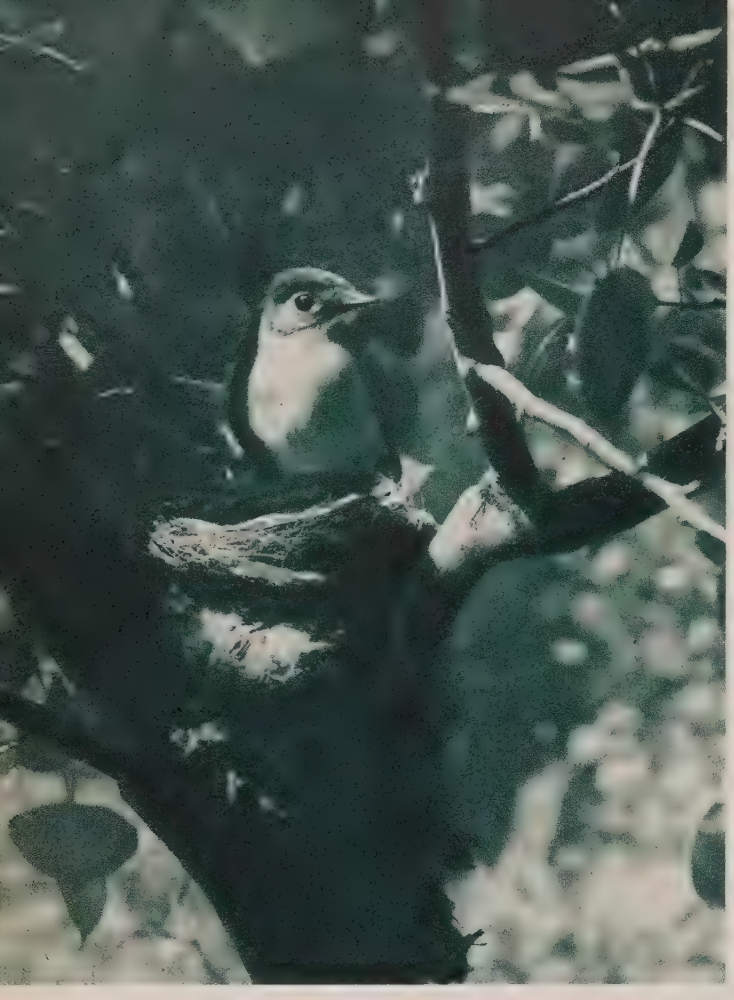
Members of the primrose family are exceedingly numerous, and the yellow primrose, sometimes called the cowslip in Europe, is a common wild flower. *Primula veris* is one of the characteristic flowers of the eastern Alps, where it proves its cosmopolitan character by adapting itself to mountain conditions. This hardy primrose also is fitted for rock garden planting, thriving in any good soil and lending a lovely yellow note to the garden.

Chrysanthemum alpinum is a rather small species frequent in the higher Alps. As its appearance suggests, it is closely related to our common imported daisy of fields and roadsides.

This dense shrubby tuft of *Rhododendron ferrugineum* is strongly suggestive in appearance of the Lapland rose-bay, *R. lapponicum,* which, in addition to claiming an extensive range in northern Europe and Asia, is an inhabitant of our own American Arctic, and of the higher summits of New York and New England. To meet with this beautiful shrub on a treeless summit in our own land is to experience a thrill that must be akin to that of Linnaeus when he first saw it on the steppes of his country. The beauty of its foliage, even after the close of its flowering season, is something that stays long in one's memory, and the delicate beauty of its blossoms always delights the observer, whether he sees it for the first time or after the lapse of years.

To thus observe the wild carrot, *Daucus carota,* on the European Alps, is to bring to one's mind a realization of the tremendous range enjoyed by this plant, considered by some to be the ancestor of our cultivated carrot. We wonder how many, seeing Queen Anne's lace, or the bird's nest plant, in fallow field or beside the country road, realize that in far off Europe and Asia it is equally common, and, as with us, is a weed. Still, there is beauty in the pattern of its leaves and in its compound umbel of florets held so bravely aloft.

The ability of this plant to spread its kind lies in the fact that it attracts a great variety of insects that spread its pollen and help it in its march over new territory.



Least Flycatcher

By W. W. Coleman and F. J. Wilson

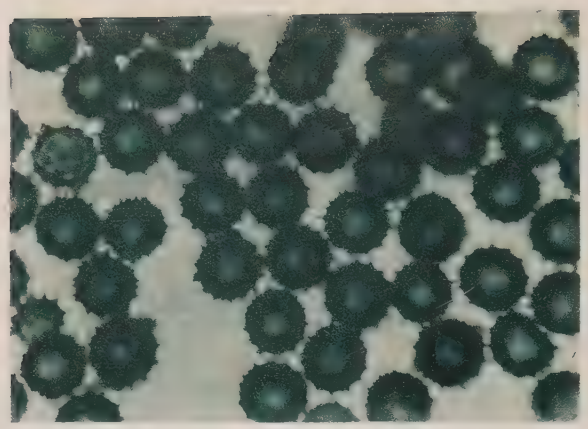
A rather unmusical but spirited call comes from a nearby tree—*chebec, chebec!* Few birds proclaim their arrival and identity more clearly than does the chebec or least flycatcher, ***Empidonax minimus.*** Equally at home in open woodland or orchard, it is one of the more familiar birds in our northeastern states. Westward in the United States it breeds in the upper Mississippi valley and into Montana, and in Canada it reaches Quebec, Manitoba, the upper Mackenzie, and middle British Columbia. The nest here pictured was found near Saskatoon, Saskatchewan, in a fork in a small cottonwood.

Soon after the bird arrives from the south the small compact nest is built. Sometimes the birds will not wait until the trees have put out their leaves, and then the fluffy structure is easily observed. It is built of fibers from the inner bark of many plants, interspersed with grasses, and is warmly lined with plant down and the hair of various animals. When finished it harmonizes well with the surroundings and is not easily observed. From three to five pure-white eggs are laid.

During the incubation period the brooding bird is not readily disturbed, and close approach to the nest is

usually possible before she takes alarm, when she will flush quietly, seeming to literally "slip away" from the nest. Several nests with young were observed and photographed from a blind only three feet from the nesting site. The routine at the nest seemed undisturbed by the clicking of shutters or by the hum of conversation nearby. Feeding of the young took place about every fifteen minutes on the average while the birds were under observation. The two youngsters pictured at the top of the page still had bits of down on them when they left the nest, but the three shown below were a bit too young to set out for themselves when this picture was taken.

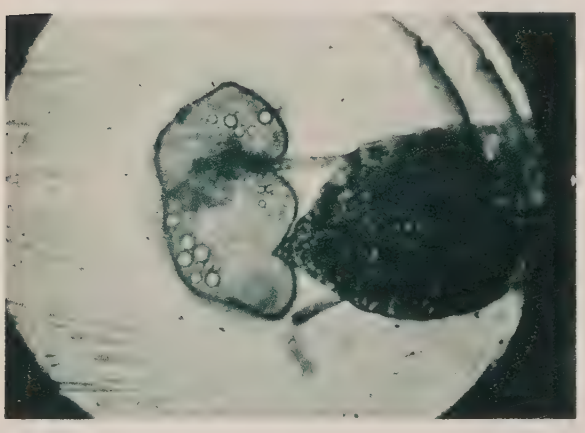
Our last picture shows a nest that has been parasitized by a cowbird, the young of which had forced the rightful flycatcher occupants out of the nest, and was receiving the undivided attention of a foster mother no larger than itself. The flycatcher found feeding a real task.

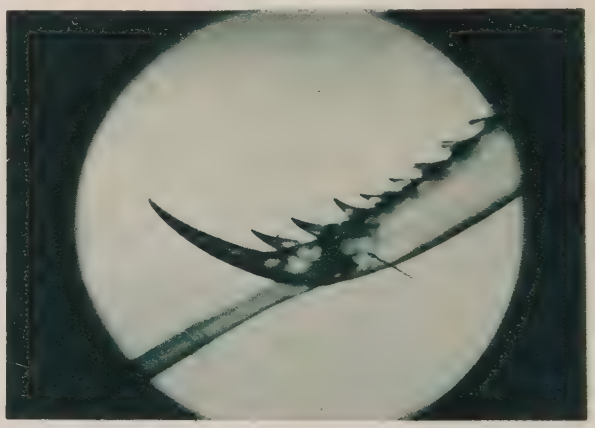


Photomicrography is the term applied to photography that records what is seen through the lens of the microscope. Births and deaths, joys and sorrows occur in this hidden world, but with a camera and microscope many interesting events may be disclosed. These photographs by Martin W. Payne of South Orange, New Jersey.

Above at the left we have a picture of a cluster of pollen grains from the rose mallow, enlarged about one hundred diameters.

The efficient brush shown above is in reality the foot of a house fly, which helps that insect in transmitting diseases. Magnification about one hundred diameters.



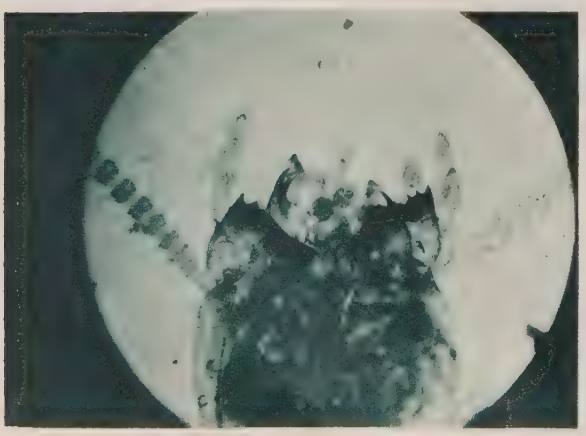


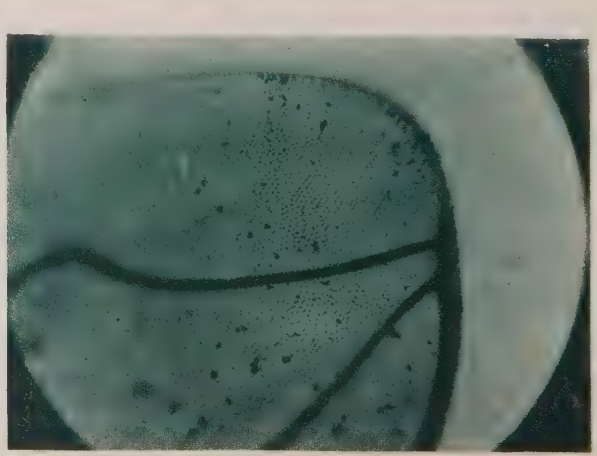
Irritated by a noxious chemical stimulus this rose aphid, while being spied upon through the microscope, discharged its defensive poison clouds for the benefit of the photographer. Magnification about 100 times.

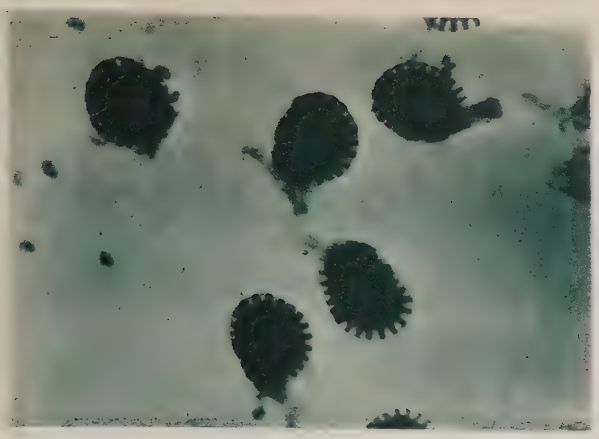
Those whose homes have been attacked by wood-destroying termites will see here the formidable jaws that make this insect responsible for tremendous damage. Magnification about one hundred diameters.

This picture of the grasping part of the raptorial leg of the praying mantis shows plainly why this predatory insect is able to hold its unfortunate prey. This subject magnified about sixteen diameters.

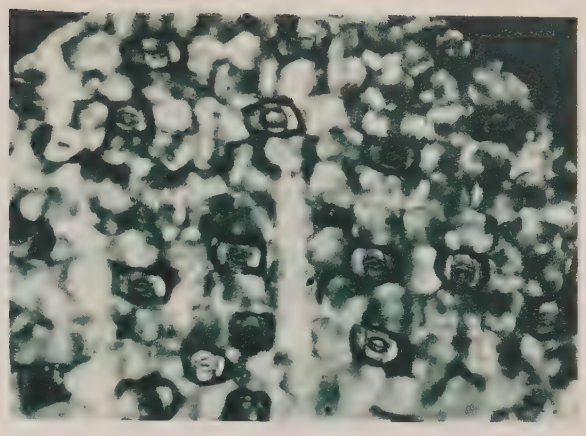
The wing of the house fly is thin and diaphanous yet it combines in its structure a maximum of strength with a minimum of weight. The part here shown is magnified about one hundred diameters.



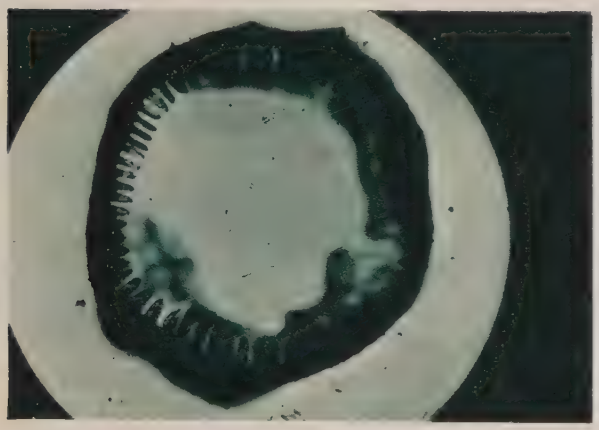




Here the microscope reveals individual spore cases of the eastern lady fern, and shows the ribbed, elastic annulus that snaps the spores to the winds when they are ripe. Magnified about one hundred diameters.

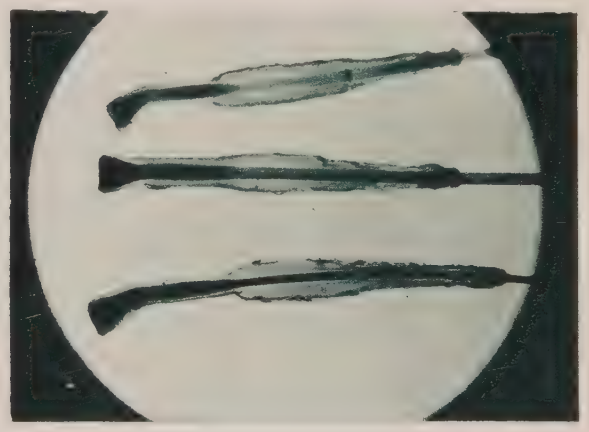


The narrow slits surrounded by dark rings in the picture above are the stomata, or mouths, by means of which plants breathe. They are most numerous on leaves. These are magnified about one hundred diameters



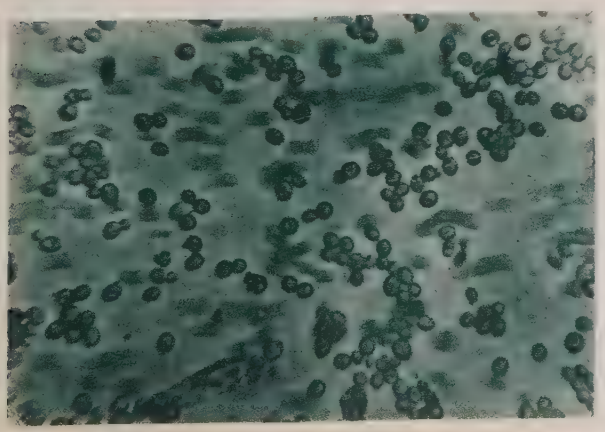
This is the top of a moss capsule, and shows the teeth that eject moss spores into the air when they are ready to germinate. Magnified twenty diameters.

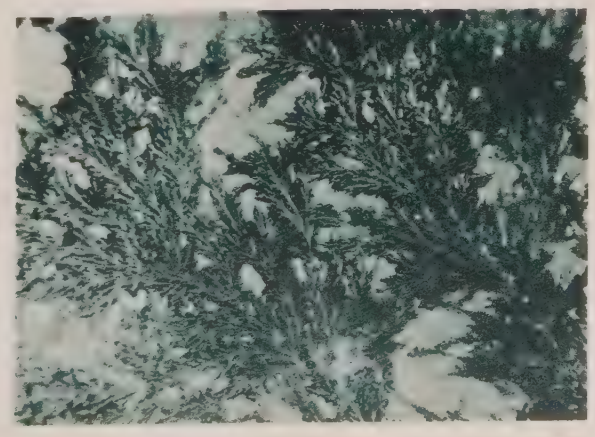
An intimate view of part of a yeast cake. These cells, some of which are budding, are only a few of the millions of similar ones that make up the much-advertised cake. Magnified 430 diameters.



This picture shows the basal parts of three human hairs, with the basal sockets into which the true roots of the hair are embedded. The magnification of one hundred diameters.

At first glance this delicate tracery suggests the work of frost or some dainty evergreen. It merely shows some crystals of the prosaic chemical, sodium salicylate.





Uncommon Pictures of Common Birds

In the caption of a picture of the long-billed marsh wren in the July, 1936, issue, mention is made of the peculiar habit of building several false nests. Here the camera has caught a bird in the very act of carrying nesting materials. This particular nest was not used, as was later determined; neither were several others that were observed and photographed at the same time by W. Burdett Moose at Conesus Lake, N. Y.

Thrushes are the favorites of many bird lovers, and to hear their songs mornings and evenings is entertainment for even the least enthusiastic of listeners. One of the more difficult of our species to photograph or even observe is the Wilson's thrush or veery. The reasons for this are the elusive habits of the bird in the breeding season, and the shady character of the low thickets where it hides the nest. Here the camera caught the parent just after it left the nest after feeding its young. The picture was taken from a blind set up near the nest at Moore's Run, Potter County, Pa.

Sometimes the Nature photographer must wait hours or days for a picture; sometimes he may catch the finest picture in a few moments. This picture of the female black-throated blue warbler on the nest involved a case where the camera man merely walked up to the nest, focused his camera, and snapped the picture. Taken in Allegany State Park, New York.

New Jersey Girl Scouts making observations on birds, on a Bird Finders' hike. Scouts who earn their Bird Finder badge must study the birds in their natural habitats. Photographs by Ruth Nichols.

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Silver Jubilee

Girl Scouts throughout the nation this year are celebrating their silver jubilee—the twenty-fifth anniversary of the founding of their organization by Juliette Gordon Low. Mrs. Low, through her friendship with Lord Baden-Powell in England, became interested in the Boy Scout and Girl Guides movements in that country, and in 1912 took the first steps toward the formation of the American Girl Scout group in Savannah, Georgia. By the year 1919 the organization had grown to be a World Association of Girl Scouts and Girl Guides with thirty-two member countries; in 1936 Girl Scouts of the United States and possessions were nearly 400,000.

Scouts of our western states enjoy frequent horseback trips through the scenic regions. Two members from Camp Chaparral, in the California redwood country, rest a moment atop an ancient stump. Their eastern sisters, from Camp Andree, New York, are learning to cook a meal in the snow.

Scouting is designed to utilize a part of the leisure time of young girls by sponsoring activities arising from the girls' personal interests in handicraft, homemaking and the outdoors. The organization believes that these activities, practiced by groups of girls under the direction of inspirational leadership, will tend to develop healthy, self-reliant, unselfish young women.

The Girl Scouts maintain, through regional and local organizations, about 350 regularly established camps for the use of members and the leaders. More than one hundred of these remain open throughout the winter, enabling those who so desire to learn of the beauties of Nature during this season as well as the summer. Health and safety are first considerations in managing of all camps.

Nature work plays a major part in girl scout activities. Of the fifty-two proficiency badges Girl Scouts may earn, eleven are devoted to various branches of Nature study. Badge requirements are such that the winners gain an excellent groundwork for future observation and study. As an example, Scouts earning the Tree Finder Badge, of which 2052 were awarded in 1936, must know the parts of a tree; must learn to identify 25 trees and shrubs when in leaf, and at least ten of these by buds, leaf scars and bark; be able to tell something of the life processes and history of trees; be able to tell the age of a felled tree by the rings on the stump; know how trees should be pruned or trimmed, and how exposed surfaces should be treated to prevent decay; describe how trees may be protected from fire, common insects and fungus diseases; plant at least one seedling that she has sprouted from the seed; make a list of woods and their uses; know the best trees to plant along streets, in small gardens, or about a school. Corresponding knowledge must be absorbed by those desiring to earn the other Nature badges.

These two young Girl Scouts from New Orleans are busy collecting specimens of pond life to earn their Insect Finder badge. Below, the evening camp-fire gathering, one of the most important events of every Girl Scout camp.

Where stands this pinyon pine, ***Pinus edulis,*** the 2000-foot escarpment of the Mesa Verde safeguarded its prehistoric inhabitants from their more warlike nomadic enemies. The dense chaparral growth of these steep slopes with intervening sheer walls made access to the mesa top difficult and dangerous.

A meal, ground from the edible nuts of the pinyon, was one of the important foods of the cliff dwellers. The pinyon-juniper forest that constitutes the chief cover of the Mesa was also the main source of fuel for these people. In their weird and fascinating cliff houses we find, remarkably preserved, beams of the pinyon pine whose annual rings tell us the time when these great pueblos were built, and the story of the climatic conditions that then prevailed in the southwest, and, most significantly, the year the trees were cut.

Today, the Indian tribes of the southwest still gather these edible pinyon nuts, and grind them into a pasty meal that is baked into small, thin cakes. In the towns and villages, pinyon nuts are an article of commerce, and their sweet, delicate flavor can be detected in some of our present day confections. This photograph was taken from the Knife Edge Highway, Mesa Verde National Park, looking toward Sleeping Ute Mountain, highest point of the range.

TREES

of the Mesa Verde Cliff-dwellers

By CHESTER R. MARKLEY

All the seasons of the year have their charms—ever changing, ever lovely. The early Spanish explorers called this land of the cliff-dwellers in what is now Colorado, Mesa Verde—"green tableland." It is not a single mass, but a series of small mesas formed by deep, steep walled canyons that traverse the tableland, like fingers, from the north escarpment to the Mancos River canyon on the south. Among these sheer cliffs these early people sought the natural caves to hold their picturesque pueblos. The prevailing tones of Mesa Verde are a brilliant green during May and June; they mature and darken by July and August. In September and October patches of red, brown, yellow and gold of the deciduous trees and shrubs intermingle with the green of the conifers; a little later they become gray and drab. Yet during the approaching winter months even the conifers may lose their identity as they become mantled with the soft, white cloak of winter; these heavily laden junipers, pines and firs of Mesa Verde may resemble stark ghosts, strange beasts, or dainty maids clad in Colonial garb. As spring approaches, the warm rays of the sun melt this protecting blanket of snow; flowers

burst forth, the buds break on the flowering shrubs, the cactuses send forth their gorgeous array of color, and the yuccas develop their heavy stalks laden with large cream-colored blooms.

The prehistoric residents of the Mesa Verde were lovers of Nature's beauty. Their pueblos commanded views of picturesque canyons; their trails seldom missed a pleasing vista of distant mountain scenery. Ancient watchtowers and ceremonial structures still stand on promontories that overlook the winding canyon trails and the far reaches of the plateau. These children of Nature truly worshiped not only the material things of their surroundings, but prayed to the Sun as their father and to the Earth as their mother. For they knew that they were dependent upon the Earth Mother to harbor the seeds of their crop plants, and upon the warm rays of the Sun Father to bring these seeds to fruition.

The forest of the Mesa Verde provided the cliff dwellers with practically all their necessities: edible fruits from the trees and lesser plants; clothing from bark, grasses and leaves; and wood for building and for

The Utah juniper, ***Juniperus utahensis,*** may simulate a Colonial maid as the white cloak of winter falls gently on the Mesa Verde. This juniper, like its less common cousin, the Rocky Mountain red cedar, ***Juniperus scopulorum,*** is one of the most durable woods found in this section. The cliff dwellers utilized its timber for posts and lintels; soft shredded bark was formed into mats, blankets, pads, rope and cord.

The Douglas fir, ***Pseudotsuga taxifolia,*** occupies a rather peculiar position at Mesa Verde. These picturesque trees with their pyramidal crowns grow in dense groups along the north escarpment and in the heads of the tributary canyons, where they often form the setting for the classical cliff houses, as here, with Spruce Tree House. During the early days of the pioneers, these trees were called spruce; so today, the visitor to the park stays at Spruce Tree Lodge, which overlooks Spruce and Spruce Tree canyons. Yet, if he were to look for a spruce tree, his search would be fruitless, for not one spruce has ever been found on Mesa Verde plateau. It is thought that the cliff dwellers found too arduous the cutting of these forest giants with their crude stone axes, therefore they were not utilized as were the smaller trees. Yet we may be sure that their impressive beauty was a source of inspiration.

fuel. The forest also supported a wild animal population that gave food; the skins, feathers and bones were converted into everyday essentials.

The cliff-dwellers have long since vanished from the Mesa Verde, yet many a descendant of these hardy people still lives in the desert pueblos to the south. Perhaps, sometimes, they dream of this verdant mesa on the far horizon, where their ancestors once lived happily in the bountiful lap of Nature.

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The broadleaf yucca, *Yucca baccata,* sends up its spear-like leaves that are ever present, the new replacing the old; thus in the winter season it still looks green and alive. In the spring its very heart sends out a large bud that grows and shoots upward until early summer, when a heavy stalk emerges from the bud, with a long spike of dainty cream-colored flowers. In a few weeks the blooms wilt and die, and large green pods resembling smooth cucumbers soon take form. These large pods are gathered by the Indians and cooked as a vegetable. The leaves produce strong thread-like fibers that the early inhabitants of the Mesa used for many purposes. The leaves were split and woven into sandals and mats. The roots of the yucca are still used by whites and Indians alike as soap for washing hair, skin, clothes or blankets. Speaker Chiefs House in Cliff Palace in the background.

The Rocky Mountain red cedar, *Juniperus scopulorum,* grows at the base of precipitous canyon walls, where the seepage of moisture from the shale formations is conducive to good growth. Here, in front of Cliff Palace, the bright sun plays on the feathery branches of this graceful tree; at times the full clusters of berries change the rich green color to pale blue, and the slight branches droop with their weight.

In our last photograph, through a vista of green boughs, one views an impressive tower in Cliff Palace ruin that stands secure after suffering the ravages of nine hundred years.

★ Conservation ★

A part of Nature Magazine each month is devoted to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

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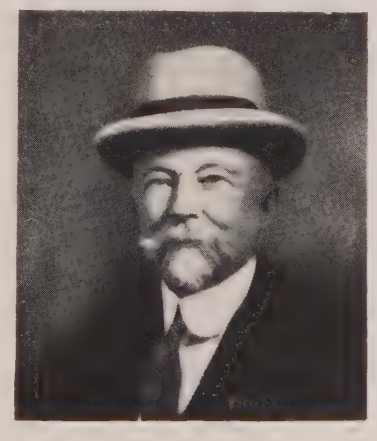
CHARLES LATHROP PACK ★

Charles Lathrop Pack rests among glorious white pines within the borders of a forest that bears his name. He chose the spot himself in the demonstration forest he some years ago gave to the New York State College of Forestry. It is fitting that one who worked and gave so fully for forestry should finally rest within an area devoted to its perfected practice, an area that owes its being to his vision and generosity.

While those who knew Charles Lathrop Pack and loved him for himself, his enthusiasm, his quiet benevolence, and his devotion to an ideal, feel a deep personal loss at his passing, his works live after him. He lived a full four score years and left the world better and wiser for his living. And when to this is added the fact that he left behind him the inspiration and means to carry on his work, we cannot but feel that release from the burdens of this mortal existence came as a recompense for all that he had wrought.



CHARLES LATHROP PACK
1857-1937

It is not for us here to recite at length the imposing list of Charles Lathrop Pack's accomplishments in the many fields that drew his interest. Nor need we review in detail the many specific things he did during more than a quarter-century devoted to conservation, particularly forest conservation. Rather would we attempt to evaluate his contribution in broad terms.

At the turn of the century conservation was an obscure word; forestry a profession practiced by a handful of men in a minor government bureau. The public at large had no knowledge of forestry, nor were they particularly aided by the foresters themselves, who then had little realization of their public responsibilities. Lavish use of forest resources, devastating lumbering, went on with scant thought of the future. Forest fires raged with no significant organized effort to control them. We were still pioneers, fighting Nature. Only a few voices were raised to urge cooperation with Nature, to suggest that conservation was more than a dictionary word.

Among the few voices was that of Charles Lathrop Pack, who had studied forestry in Germany, intimately knew lumbering methods in this country, and owned timber lands. When Theodore Roosevelt, in 1907, called a conference of State Governors, Mr. Pack was invited to attend because of his conservation background. Later he served on a conservation commission set up by the President, and, in 1913 and 1914, was president of the National Conservation Congress. From 1916 to 1922 he was president of the American Forestry Association, having been a director of that Association for a longer period.

Through this active association with forestry and conservation work, Charles Lathrop Pack crystallized two vital ideas that were vastly to influence forest conservation in this country. First, he held that no forestry program—whether legislation, forest expansion, fire prevention, administration, reforestation or scientific progress—could succeed without public support. Second, he held that forestry must be practiced by men with the best possible training bulwarked by the benefits of re-

search and specialized study in advanced forestry practice.

To accomplish his first purpose Mr. Pack set about to give the American people a forestry education; to interpret forestry in terms of what it meant to you and to me. He formed the American Tree Association, to become a member of which, one had merely to plant a tree and register a record of that planting with the Association. He argued that affection for and interest in one tree would extend to all trees. He proved his point, as the ranks of the tree planting army amply testify. Mr. Pack sent millions of tree seeds to Great Britain, France, Belgium and Italy for planting on devastated lands or areas denuded by the demands of war. In this he saw an opportunity to dramatize the meaning of reforestation, and the young forests of trees grown from these seeds in Europe are graphic evidence of his vision.

Further to carry his education program into effect, Mr. Pack brought out *The Forestry Primer,* a simple discussion of forestry problems. Four and one-half million of these have been given away, reaching a generation of young men and women who were then in schools and now are voting citizens. During the Washington Bi-Centennial observances, and, more recently, in connection with the sesqui-centennial of the Constitution, he published and distributed hundreds of thousands of tree planting booklets. Other booklets on specialized subjects, but designed for the layman, have been brought out and widely used.

In connection with all this work Charles Lathrop Pack enlisted the cooperation of newspapers of the country and received hearty collaboration. Recognizing in Mr. Pack's enthusiasm for forests and forestry a plan without ulterior motive, an unselfish expenditure of effort and money for a constructive purpose, the editors of the country worked with him by according generous space to his news releases and forestry news sheets. And as this is written, the editors of the country are paying him sincere tribute in their editorial columns.

To carry into effect his conviction that the best in forestry training must be provided, Mr. Pack endowed chairs of forestry at several colleges, and presented to several universities demonstration forests similar to the one within whose boundary he now lies. He set up the Charles Lathrop Pack Forestry Trust to carry on his work. He created the Charles Lathrop Pack Forestry Education Board to provide opportunity for outstanding student foresters to carry on special work. He gave liberally to a wide variety of projects to further forestry as a science, and to aid individuals in giving their best to their profession.

This is what Charles Lathrop Pack has left with us. He has furthered forestry as a profession and a science. He has placed back of it a force of public thought that sustains it and supports a forestry program on the part of the Nation and in virtually all of the States. It is vouchsafed to few of us that we should merit the words of the editor of the *Washington Star* who wrote:

"Mr. Pack personified the doctrine of unselfish devotion to the common weal. When his biography is written it will demonstrate from first to last—the Golden Rule in practical application. . . . His influence inspired entire communities. Nor will it cease with his passing. Such personalities never die. Gratitude preserves them forever."

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CENSUS AND SEASONS ★★

We note with interest a late May release of the United States Bureau of Biological Survey announcing that field parties of biologists and game management agents of the Survey were heading for the marsh and lake region of Canada "to learn how wild ducks and geese are faring this season on the nesting ground." The objective of the studies is, of course, to determine trends in waterfowl numbers as a guide to drawing up the shooting regulations for the migratory waterfowl hunting season.

Such investigations, provided they are competently made, are valuable. Handling of our remaining wildlife resources must be based upon scientific fact and not hearsay, prejudice and propaganda of selfish interest. We shall await with interest the report from the Canadian waterfowl breeding grounds. They will, in all probability, record an increase in ducks. All reports available to date, however, do not indicate that the numbers are sufficient to sustain shooting, even at the present rate, with any assurance of an adequate future supply. We believe that two years of completely closed season for ducks and geese are vitally needed. Yet we know that the duck stamp for 1937 has been printed and publicized, that the reports from the investigators will not be forthcoming until virtually the opening of the season, and that, judging by the past, ducks and geese will face the annual barrage on their southward flights this fall irrespective of the findings.

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FIRST STEPS IN REORGANIZATION

A modified governmental reorganization bill that still follows the general skeletal outlines recommended by the President has been introduced in the Senate by Majority Leader Joseph T. Robinson. The measure is the first formal print of the President's suggestions, although a tentative draft had been submitted by Louis Brownlow, chairman of the President's committee on administrative management. Features of the Robinson bill include: Changing the name of the Interior Department to the "Department of Conservation" and vesting broad powers in the President to transfer, group, consolidate or abolish agencies and functions to promote efficiency. However, the bill provides that presidential reorganization orders must be submitted to Congress and would not become effective for 60 days. Congress, therefore, could block any reorganization order, but the President could veto any legislative action and in so doing necessitate a two-thirds vote of both houses.

THE WESTFIELD TOWN FOREST PERFORMS DOUBLE SERVICE

Besides providing a valuable source of timber it protects the watershed and eventually will yield a $20,000 lumber crop to the community annually

Town Forests Pay

Time has shown value of this movement in Massachusetts

By HAYDN S. PEARSON

Twenty-five years ago the town forest in America was primarily an idea. It had proved its worth in Europe, but with all our forest wealth was not considered important for us. Then Massachusetts passed a town forest law inspired by the Massachusetts Forestry Association. Forests were established. Now it is possible to weigh the results, as Mr. Pearson does here in most illuminating fashion

THE STORY of civilization is a history of the clash of ideas between men of vision and men whose horizon is the present. And in Massachusetts, in a victory by men of vision, conservationists are cheered by the results of the town forest movement. There forests are paying dividends, not only in recreation for citizens and sanctuaries for wildlife, but in a dollar-and-cents manner that means public support for further expansion.

There are ninety-eight town forests in the state, with an acreage of 30,143. The Town Forest Act, passed by the Legislature in 1913 through the efforts of the Massachusetts Forestry Association (now the Massachusetts Forest and Park Association), encouraged communities to establish forests. At the present time, there are about 40,000 acres, owned by municipalities for protection of watersheds, that have not yet been placed under the Act. It is not unreasonable to expect that within a decade the town forest acreage will more than double.

What are actual dividends from representative forests? In Westfield, from an area of 5404 acres where 726,000 trees have been planted, the welfare department of the city has secured as much as 5000 cords of wood in one year. This means a reduction in taxes to the citizen. Even at present stumpage prices, if the area is kept under forest management for the next three decades, the city will be in a position to harvest a $20,000 annual crop of timber.

This forest was established, as were many others, for the purpose of protecting the community's water supply. This has a definite economic bearing on the returns of a town forest, for the water needs of a modern municipality are a vital problem, although it is difficult to speak of the value in dollars. Westfield began its watershed forest early in the century, entered it as a town forest in 1929, and this forethought is now paying dividends.

North Adams has the largest town forest in the State, 6720 acres, and is growing hardwood species for fence posts, an item that costs real money in road construction.

One of the most interesting forests in the State is in the town of Russell. The population of this Berkshire town is 1283. The town forest has 3000 acres. This hill town, with many upland acres of marginal land and abandoned farms, discovered that the back-woods farms contributed little in taxes to the upkeep of the town. Therefore, the town fathers moved the families concerned from marginal places to good land near the center of the town. Money previously spent on roads and rural schools was saved. The hill farms became a town forest. Two hundred forty-six thousand trees have been planted. This town forest shows intelligent community judgment. Municipal costs have been reduced, some economic dividends in cord wood have been obtained, and in a few years the annual income from lumber will further reduce tax rates.

Town forests have come into being through definite channels: use of watershed areas, town or poor farms, purchases and gifts. And, furthermore, many of these forests serve as bird and game refuges.

The town of Groton made its town farm a memorial forest to veterans of the World War. Having the advantage of a good timber stand at the start, the area has been more than self-supporting, although $2500 has been

YOUNG TREES IN THE TOWN FOREST AT GREENFIELD

Not only do such areas produce cash crops of timber and aid in checking floods, but they serve as recreational areas and as adjuncts to the schools

spent on it. The 280 acres has timber that is increasing in value, and some cordwood is cut each year for sale. It is interesting to note that Groton has established the first wild flower sanctuary in a town forest, so far as the writer is aware.

Petersham is a pertinent illustration of what a town can do. Its town farm had ninety-nine acres, which the town fathers were planning to sell. But the late Professor R. T. Fisher, who was director of the Harvard Forest, persuaded the town to convert the farm into a town forest. This was done, and a sale of a part of the matured white pine in the area netted the community $5200. This was actually more than offers received for the whole farm, but such income cannot properly be credited to production by the town forest, since the timber cut was raised before the plan was adopted. The forest still has 165 acres of young growth and some merchantable timber.

Hudson's town forest, established in 1930, has 172 acres. From this 1077 cords of wood and 206,000 feet of lumber have been cut, and 900 beautiful young trees taken for use on roadsides and other public areas. One hundred and two thousand trees have been planted. This illustrates another source of economic value, for town forests mean that urban streets, rural roads, commons and other publicly-owned lands can be beautified at lower cost.

Experience has proved that the purchase price, to be economically sound, should not run much beyond $10 an acre, although local conditions naturally govern this matter. Location, soil conditions, amount of wood growing, and its size and species, all enter into the picture. As an example of another source of income, realized in such towns as Norton, Walpole, Natick, Greenfield and Pembroke, rent has been obtained for buildings on the property, or for the use of some of the land. Plainsville rented an area for a roadside stand.

Some of the town forest committees have not kept accurate figures on all the sources of revenue to the town, but communities are realizing that the cordwood, the lumber, the posts, poles, and the ornamental trees and shrubs represent real money. Town forests have enabled the labor of the unemployed to be used to advantage.

The picture of town forests would not be complete if we failed to mention their educational and recreational value to the general public. Thousands of people get intangible returns that cannot be reckoned in money. The town of Walpole, on its 329 acres, established in 1916, has done outstanding work in this respect. Little cutting has been done, although at present there is a considerable amount of mature timber. The area is a wildlife sanctuary, and many food-bearing shrubs have been planted. The forest is near the high school and is used by the students and teachers as a laboratory for Nature study.

The town forest movement, gradually spreading over the nation, is beyond the experimental stage. Each state has much land that is primarily suited for this type of management. Unless communities take steps to establish forests, the land will continue unproductive.

For the past four years, the Federal government has been spending huge sums to help municipalities reclaim public lands. Towns with idle lands have an opportunity to use this aid by acquiring town forests.

Massachusetts, in the twenty-four years since legislation

made it worthwhile for towns to own and administer forests, has demonstrated the actual economic, educational, and recreational values that may be derived. The town surrenders none of its rights. It declares its intention of undertaking conservation in the true sense, and because of this, the State furnishes the trees to be planted free of charge. It is an actual demonstration of democracy at work for the greatest good of the greatest number.

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Irrigation Project Threatens Rocky Mountain Park

Conservationists should not fail to call the attention of their Senators and Representatives to this threat that may culminate in an open defiance of National Park standards

At the last session of the last Congress a proposal for a water diversion project involving tunnelling in Rocky Mountain National Park rode in on the House Appropriations Bill. Fortunately, defenders of the National Parks were on the alert and this vicious rider was unseated.

Now the issue has come to the fore again. As this is written, a bill—S.2681—introduced by Senator Adams of Colorado, has passed the Senate, authorizing this plan as a Federal Reclamation project. The measure has been referred to the Senate Committee on Irrigation and Reclamation. Also, the Department of Interior appropriation bill has been passed by the House and is in the hands of the Senate committee. It is expected that this bill will emerge from committee carrying in it an appropriation for the project.

It is, therefore, pertinent to present the facts. This we could not do better than by reprinting an editorial summary of the tunnel plan printed in the June, 1937, issue of *The National Park Bulletin* of the National Parks Association. At its annual meeting in May that Association declared that "use of this park for commercial purposes would create a precedent in defiance of the standards set up by Congress during the past twenty years and lay the National Park System open to economic exploitation".

Eternal vigilance must be exercised if our National Parks are to be preserved from such uses as are proposed in this instance. There have been various attempts in the past to exploit them, usually for irrigation or power purposes. The barriers must not be let down, and the following analysis by the National Parks Association presents the facts:

"The Reclamation Bureau, seeking to win public approval, has issued a comprehensive report of their latest plan to tunnel Rocky Mountain National Park. Officially this plan for irrigation and power development is known as the Colorado-Big Thompson Diversion Project. Careful study of the plan reveals that it is practically identical with the one proposed last year, which a tremendous nation-wide protest succeeded in defeating in the closing days of the 74th Congress.

"The new project calls for expenditures amounting to forty-four million dollars, a considerable increase over last year's estimate, and is for the purpose of diverting water from the headwaters of the Colorado River into three tributaries of the South Platte River on the eastern slope in Colorado. The project proposes, by a series of diversion ditches, dams, and reservoirs, to impound slightly over four hundred thousand acre feet of water on the western slope just outside the boundaries of Rocky Mountain Park. This water would then be pumped into Shadow Mountain Reservoir which is connected with Grand Lake. Water from Grand Lake would then drain through the tunnel under the park and the continental divide. On the east slope the water would pass through a power plant and by means of a complicated series of ditches it would be delivered to several reservoirs in the foothills.

"The west portal of the tunnel is planned several hundred feet outside the boundary of the National Park. The east portal is planned just outside the present park boundary but within an area authorized by Congress in 1930 for addition to the park. This area, known as the Wind River Basin, has long been recognized, both nationally and locally, as a desirable addition to the Park. Likewise, a portion of Grand Lake was authorized for addition to the park by Congress in 1930.

"To the casual observer, it might appear that this construction involves little or no direct damage to Rocky Mountain Park. Such, however, is not the case, for the project involves the possibility of doing serious damage directly and indirectly to the park. An examination of the project and its relation to the park brings to light a number of ways in which the natural landscape and primeval character of the park will be damaged by this construction. It is known that considerable unstable ground in the form of shear zones, will be encountered in driving the bore. The tapping of this unstable earth and the attendant blasting will, according to geologists, probably affect the water table of the surface above, and, in addition, it will probably affect adjacent streams and may lower or totally drain the alpine lakes over this unstable ground. Twenty-three of the park lakes are located near the bore. These alpine lakes are a vital part of the park picture, and it was to preserve such scenic features that the park was originally established by the Federal Government.

"Engineers are not in agreement as to a method of ventilating the tunnel during construction. Several experts on the matter maintain that intermediate shafts or a twin bore with cross-overs, will be necessary to meet the ventilation problem. If it becomes necessary to sink intermediate shafts, several areas of the utmost importance to the park would be absolutely ruined. It is our understanding at this time that backers of this project are in no position to say what method of ventilation will be used. Construction of shafts will involve road construction through the park to the shaft site, construction camps at the site and disposing of debris from the shafts on some of the choicest areas in the park.

"The plans for construction of the tunnel call for camouflaging the obnoxious debris dumps at the tunnel portals by terracing and planting with evergreen trees, or using the debris to fill up low areas and render these areas suitable for the building of summer homes. Due to the rocky nature of this material it is readily apparent that such a scheme will be ineffective. Top soil to cover the debris and fill the voids in the dumps is not available unless hauled from considerable distance at an expense that would be prohibitive.

"Grand Lake is the largest natural body of water in Colorado, and the enlarging of the lake by Shadow Mountain Reservoir will alter the west shoreline of the lake and merge it with the artificial Shadow Mountain Reservoir. This enlargement, together with the construction of the tunnel at the eastern shore of the lake, will destroy the natural beauty and appeal of the lake and the area.

"Of prime importance is the effect this tunnel will have upon the approaches to the national park. The scenic qualities and natural landscape of the approaches will be entirely altered by this construction. The only highways leading to the park will pass through a maze of high tension power transmission lines, flumes, open ditches, dried up stream beds, reservoirs, siphons, and kindred irrigation and power developments. Estes Park and Grand Lake, the two entrances to the park, will be the scenes of construction activity and camps for four or five years and legitimate park uses will be greatly interfered with during that time.

"A general impression exists that this project affords the only means of getting additional irrigation waters to Colorado's entire eastern slope. As a matter of fact, this diversion, or one immediately to the south and outside Rocky Mountain National Park, would provide a means to divert water into the Big Thompson area from the Colorado Basin. This project is only one of four schemes now under consideration to pierce the continental divide with diversion tunnels to bring more water to the State's eastern slope in addition to that already diverted by the Moffat and Busk-Ivanhoe tunnels and seven diversion ditches through passes on the continental divide. One tunnel diversion from the headwaters of the North Platte River and one ditch diversion from the Colorado River now serve the Big Thompson area.

"Much has been said about the Proviso included in the act establishing Rocky Mountain Park which authorizes the Bureau of Reclamation to enter the park in connection with the construction of a Government irrigation project. This wording in the establishing act was provided by Secretary Lane because certain lands around Grand Lake had been withdrawn in 1904 for use in connection with the proposed Grand River project on the western slope. Plans to use Grand Lake for this project were abandoned in 1921, rendering the application of the clause to this project inoperative. Its reason no longer exists. It should also be pointed out at this time that the act establishing the park stipulates that no irrigation or power projects shall be constructed within the park except 'whenever consistent with the primary purposes of the park.'

"Investigation reveals that the entire urban and rural portion of the area to which this water is to be diverted, amounts to approximately 175,000 persons. In 1936 alone, Rocky Mountain Park was visited by 550,300 people and since its establishment in 1915, it has had a total of 5,228,980 visitors.

"Those who are familiar with this section of Colorado believe that this tunnel could be constructed by another route south and outside of the park. The use of this route would eliminate any possibility of damage to the national park, preserve Grand Lake, and although it would call for some revision of ditches and reservoirs, could still serve the territory to which it is proposed to divert this water. The engineers who have just completed the recent report dismiss this route on the grounds that it would involve additional construction expense and would not offer the desirable power sites that are to be found on the route through the national park. Before further steps are taken to press the Grand Lake diversion tunnel, exhaustive studies should be made of the alternate route to the south of the park to determine its exact possibilities and construction costs.

"The implications involved and the precedent that would be established should this irrigation and power project be authorized for construction through Rocky Mountain National Park are very real and vital. It is now definitely known that the Colorado-Big Thompson Diversion Project will be destructive directly and indirectly to some of the very values which Rocky Mountain Park was created to protect and preserve. The precedent set, if this exploitation is permitted, will endanger the country's entire national park system. Those backing the project have recognized these facts and have attempted to minimize the damage by camouflaging the debris and similar concessions. Friends of the park realized from the start that it was impossible to carry out this construction in a manner compatible with the preservation of the natural landscape and primeval character of the area, and while it may be admitted additional water is necessary for irrigation purposes on the eastern slope, the diversion tunnel should not be constructed to the detriment of Rocky Mountain Park when it is possible to secure the water through an alternate route."

YELLOWSTONE WOLVES

By MARGUERITE L. ARNOLD

FOR MORE than ten years the big timber wolf and the mountain lion have been more or less of a myth in Yellowstone Park. True, each year someone sees, hears, or observes the tracks of what was *undoubtedly* a wolf or a lion. Some of these reports are, without question, authentic, although one is inclined to question the lad who, sleeping out not more than half a mile from Park headquarters, "heard a mountain lion scream in the night". That there used to be many more wolves is shown by old wildlife reports, some of which state "they are much too common", "they destroy many elk" and so on. Vernon Bailey in his *Animal Life of Yellowstone National Park,* says, "During the summers of 1914-1915 they were especially destructive in the park and were following the elk herds to their high pastures of Mirror Plateau, returning with them in winter to the valleys along the Lamar and Yellowstone Rivers." It is well known that wolves and mountain lions are the most destructive of predators, yet they have become so scarce in this section of the country that for a number of years both have been protected in our greatest National Park, and during the past two years the coyote has joined the ranks of the protected.

In former years, during the winter months, Yellowstone rangers spent a lot of their time hunting the wily coyote, which, if allowed to multiply unmolested, takes a heavy toll of deer and antelope. Often a winter-killed elk lured coyotes to repeated feasts, and rangers with their rifles took advantage of this fact. My husband returned late one evening from a patrol on skis to the head of Tower Creek, and I sensed immediately, before he said anything, that something unusual had happened. Ben made a practice of telling the baby and me all about the taking of each "dog" as he brought him home. Most of the stories were thrilling too. This particular night I rushed to the door to see the quarry he had brought, but found nothing. Finally he said, "Guess what?"—and then a long pause during which I became more curious and impatient. "I just saw four wolves!" "Oh, not wolves!" I said, foolishly, knowing very well there was no mistake this time. We had observed what we were satisfied were wolf tracks, but had said little or nothing about them because we knew of the "undoubtedly" reports. We knew wolves to be more or less migratory in habit and thought the tracks had been made by one or a pair of them traveling through the district.

So Ben told me how, on the way up, he had found the carcass of an old winter-killed cow elk that coyotes were beginning to work on. On the way back, just before looking over the top of a little knoll that hid him from the carcass, he had heard the sound of teeth crunching bones,

DRAWING BY EDMUND J. SAWYER

"GOUGING, SPRINGING IN, PULLING BACK, GULPING DOWN HUGE BITES."

so he was especially careful, knowing "dogs" were there eating. As he peered cautiously over the top he said he refused to believe his eyes. His first thought was that bears had come out of hibernation, although it was mid-winter, but there, tearing and gulping at the tempting food, were four great, dark, hulking wolves. In the background three coyotes stayed at respectful distances, hungrily watching the feast. The wolves appeared three times larger than the slim, gray coyotes, and nearly black by comparison. As Ben crouched the gun lay forgotten at his side in the snow. The wolves literally lunged into the carcass, pulled back with a huge bite, "wolfed" it down and were right back for more. Finally a slight shift in the wind or the uncanny danger sense of the coyotes prevailed, and one by one they slipped away into the fast-gathering dusk. Soon the wolves, gorged, left also, trotting off unhurriedly along the trail.

The next day was one of the red letter days of my life in Yellowstone. It has always been my highest ambition to observe and study all the animals here in their natural

setting. Lying prone in the marsh grass all of one afternoon I watched a family of six otters at play, and I have pried closely into the intimate family life of bear, buffalo, elk, deer, antelope and many others. When lions and wolves were plentiful I was too young to be anything but frightened by the prospect of getting near one. All unexpected, here was my golden opportunity. So, when the next dusk started to gather, I pulled on my snowshoes and started out, leaving my generous husband at home with the wee one, so mother could have her adventure. Climbing the long steep hill, I about decided it was to be fruitless effort—that it was most unlikely that the wolves would return to the same spot. But I used every precaution in stalking the spot, nevertheless. For the last two hundred yards the trail was nearly straight up, and, between the exertion and the excitement, I was certain any animal within half a mile would be frightened away by the pounding of my heart and my gasps for breath. But I kept on, and finally, near the very summit, I lay flat for a few seconds to regain some of my composure. While I waited there, not more than seventy-five yards now from the elk, I could distinctly hear a crunching of bones—my trip had not been entirely in vain!

"—TWO HUGE BLACK FELLOWS LOPING EASILY ALONG THE TRAIL—"

"—SO CLOSE THAT I COULD SEE THE BLACK LINE THAT RUNS FROM THE CORNER OF THE EYE BACK ACROSS THE FACE."

It is a treat for a housewife to be able to observe just one lone coyote at his meal, and now I knew I would see at least that. Finally my curiosity got the better of me and before I was much rested I raised my eyes slowly, slowly, up behind a small sagebrush and over the crest of the hill. There I saw not one, but four coyotes at their evening feast of elk. I felt a slight disappointment at first that none of the wolves were there, but was soon absorbed in the antics of the "little wolves". After that evening I can readily understand why it is so difficult to sneak up on a coyote. They gnaw on a bone for a while or dig around inside the carcass and then up goes a head to test the wind and at the same time to make a visual and sound survey. Fortunately the wind stayed in my favor and, with just my eyes over the top of the hill and a grove of dark firs back of me, they failed to see me at all. Once or twice one looked right at me and I "froze" to escape the notice I felt was imminent. By this time it was really growing dark, and I was just about to attempt an exit, when something caught my eye down one of the animal trails. It couldn't be! It was! There was no doubt at all even though I had never in my life seen such an animal before; no, not even in a zoo. Not just one of them, but two huge black fellows loping easily along the trail, noses down as though following a scent. They had a peculiar jack-knife gait like that of a greyhound, utterly different from the gliding, noiseless gait of the coyote. On they came, straight toward me and the carcass, and my heart did something 'way up in my throat. They didn't look up at all but loped straight into the choicest part of the elk and commenced tearing out meat and bones, gouging, springing in, pulling back, gulping down huge bites. The coyotes did not leave the scene but discreetly withdrew from striking distance and sat, or walked slowly about, intently watching their big cousins. They appeared to be of an entirely different family from the great dark wolves—so much smaller, more slender and much lighter in color. The heavy shoulders and forequarters of the wolves were especially impressive. I remember blinking and straining my eyes to see every single detail in the fast-thickening dusk, and just after that the climax of the whole episode occurred. One of the wolves decided to look about and see that all was well and started off at an angle that brought him to the edge of the hill not more than forty feet from where I was hiding. He was so close that I could see the black line that runs from the corner of the eye back across the face. As he stood, broadside, I could see perfectly how proportionately more powerful he was than any coyote. I certainly held my breath then, for he turned and looked straight at me! I was in plain view, but I remained perfectly motionless as he looked at me with an uncomprehending stare for part of a minute—it seemed ten! Finally he turned silently and, without a sound, disappeared into the night. The others were, even then, not warned, for their activities continued undisturbed. But I could no longer contain myself—childishly I "had to see what they would do if they saw me." I stood up. Simply that and as quietly as I could, but the remaining wolf and the four coyotes scattered without a sound in as many directions. I don't know how I got back to the cabin, I was so excited and so brimming over with my story. I guess I was a little bit frightened too, as I realized what great hulking beasts those wolves were!

It will be many a day ere an adventure comes to me that will eclipse this twilight meeting with the big wolves.

Things to Think About

At a meeting of the Association of Midwest Fish and Game Commissioners held at Sioux Falls, South Dakota in June, the Association went on record asking that regulation of waterfowl shooting be no less stringent than during the 1936 season. It was also asked that North and South Dakota, Minnesota and Wisconsin be placed in the same zone and that Illinois, Iowa and Nebraska be zoned in another classification. Frank O'Connell of Nebraska was elected president, and Ernest Swift, deputy conservation commissioner of Wisconsin, vice-president of the Association.

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Tabulation of hunting accidents in Pennsylvania for the 1936 season shows that of 162 accidents, sixteen of which were fatal, 110 were caused by other persons than the individual injured. Forty-nine of the individuals injured were under 21 years of age, and 36 of the total injuries were caused by minors. There were 541,672 hunting licenses issued.

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Under terms of the measure passed by Congress, the Civilian Conservation Corps has been extended for three years. The three-year limitation was agreed upon only after a conference between the two Houses, during which the Senate urged that the C.C.C. be made a permanent agency and the House insisted upon a two-year extension only.

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Among the resolutions adopted at the recent annual convention of the Izaak Walton League of America were: (1) approval of the principle of a proposed bill to ear-mark the present excise tax of ten percent on sporting arms and ammunition for the purpose of giving aid to the states in wildlife restoration projects; (2) objection to transfer of the Forest Service and the Biological Survey and other agencies concerned with woods, waters and wildlife from the Department of Agriculture; (3) objection to a change in the name of the Department of Interior to Department of Conservation "as being at once misleading and calculated to increase rather than diminish confusion of thought and management;" (4) urging negotiation of a treaty between Canada and the United States to govern Great Lakes fisheries common to both countries; (5) demanding passage of the Lonergan anti-pollution bill and condemning the Barkley-Vinson Bill in its present form.

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"While you have attained distinction in your profession, tonight you are recognized more especially for your work in conservation." With these words Raymond A. Kent, President of the University of Louisville, conferred upon Tom Wallace, Editor of the *Louisville Times,* the degree of Master of Arts for his work in teaching, through editorials, speeches and personally conducted campaigns, the value of conservation of America's natural resources. The University thus gives recognition for conservation efforts. Mr. Wallace well deserves the honor he received. He has devoted many years to advocacy of better economic and biological use of soil, forests, game and fish, both on the platform and in his editorial columns. He fought and won the battle to save Cumberland Falls from an Insull power project, and several years of stumping and editorial writing paved the way for the restoration of the State Forestry Bureau that was mistakenly abolished as a measure of economy. He is a past President of the Southern Forestry Congress, and at present a member of the Board of Directors of the Izaak Walton League and the National Conference on State Parks.

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President Roosevelt has called on Congress to create seven national planning agencies similar to the Tennessee Valley Authority in an effort to solve the problems of floods, droughts and soil erosion. The President also asked that provision be made for administration of hydro-electric projects undertaken as part of the watershed developments. The regional agencies would cover the Atlantic seaboard, the Great Lakes and Ohio Valley, the valleys of the Cumberland and the Tennessee, the valleys of the Missouri and Red River of the North, the basins of the Arkansas, Rio Grande and Red rivers of the South, the valleys of the Colorado and all other rivers reaching the Pacific south of the Oregon State line and, lastly, the Pacific Northwest. Soon after the message was read in the two Houses, two bills, similar in nature but different in machinery and in rate-making powers, were introduced by Senator Norris and Representative Mansfield.

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The sugar pine bill has now passed both houses of Congress, authorizing the purchase by the Interior Department of one of the last stands of virgin sugar pines in the country. Under the terms of the measure, 7500 acres of privately-owned land will be acquired and added to Yosemite National Park, California, preserving for all time the great trees that, in the words of John Muir, rank second in beauty "only to King Sequoia." As we go to press the bill awaits House action on a clarifying amendment added by the Senate.

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Maintenance of Upper Myakka Lake, Sarasota, Florida, one of the wildlife wonderlands of America, at a minimum area of 1500 acres during dry seasons, will be assured by the construction of a dam across its outlet, the National Park Service reports. A key wintering and breeding ground, the Myakka Valley offers year-around sanctuary for birds of many kinds. More than 200 species visit or live in the 11,000 acre state park and the 17,000 acre forest that adjoins it.

Maine's Desert

By FLORENCE M. BENNELL

PHOTOGRAPH BY THE AUTHOR

NEW ENGLAND'S OWN SAHARA

Near Freeport, Maine, three hundred acres of farm land now lie under thirty or forty feet of sand. Only tree-tops are visible, and so little of them can be seen that they give the impression of being low bushes

WHILE we were driving north from Portland on a summer visit to Maine, our attention was called to signs reading "Visit the Desert of Maine—A Little Sahara in America."

Being keenly interested in the wonders of Nature, we decided to go and see the place. Nearing Freeport, about half way between Portland and Brunswick, we left the main highway and drove over a narrow, dirt road for a distance of three and one-half miles. The day was hot, with a warm breeze blowing, and before we reached the little Sahara our car was covered with a light coating of yellowish-brown sand.

Nearing the desert, a large, old tumble-down barn, partly buried in sand, was the first thing we saw. This barn, we were told, is the place where J. Alvah Tuttle, only surviving son of the original owner of the farm, helped when a boy to harvest the large crops and store them away for future use. Mr. Tuttle was born on the old farm, but now lives in Freeport.

Within the past fifty or sixty years about three hundred acres of the farm have undergone a complete physical metamorphosis, sand dunes now covering what was once fertile land. The estimated depth of the dunes is from thirty to forty feet. Chemical reaction from the vegetation has given the soil about twenty different tints, as we could plainly see by scooping up the sand with our hands. It is extremely fine in texture, and it sparkles with mica from the original granite formation from which it has been ground. It is a colorful and interesting region.

Probably the sand is of glacial deposition and possibly the bed of an ancient lake has come to light. One thing is certain; the land originally produced large areas of forest.

The father of Mr. J. Alvah Tuttle signed a contract with the Maine Central Railroad to supply wood for the engines. So the large forest trees were felled. When the railroad replaced wood with anthracite coal there was no longer a market for the huge trees. The owner decided to return again to farming for a livelihood, but he found that wind erosion had set in and that the once fertile farm was now spotted with areas of sand. As an experiment these arid dust areas were covered with brush and clay, but it was too late. We saw places that had been lowered forty feet from the original levels by the sweeping movement of the sand dunes. Small trees have been completely covered, while the tops of the largest trees that are left protrude from the summits of the dunes and now present the appearance of bushes four to nine feet in height. Gradually the bushes will disappear as the sand encroaches. The tops of many trees that have been buried for years are still living; a few of the fruit trees blossom and bear fruit. We saw one tree bearing small green apples.

The original spring-house of the farm is now ten feet under sand. When we visited the desert a new spring-house was in course of construction, and was to be used to cover a new spring of cold, bubbling water recently discovered not far from the site of the original spring.

Vegetation is constantly changing on the desert. In places the surface of the sand is damp and here mosses

appear. We saw groves of lovely small white birches, and many patches of witch grass growing. Whether the spread of sand will cease and the desert will again become a fertile farmland, or whether the sands will continue to pile at the rate they are now doing, to cover a thousand or more acres within the next decade or so, is an interesting conjecture. No one, of course, is able to say.

But if you are in Maine at any time, travelling north from Portland, do not fail to leave Route 1 just before reaching Freeport, drive inland and visit for an hour or two this wonderful work of Nature. I am sure that it will prove as interesting and instructive to you as it did to us.

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The Cliff Dweller

By P. B. PEABODY

HOME OF THE ROCK WREN

This bird, taking a leaf from the book of its neighbor, the wood rat, often builds its conglomerate nest in a cavity in a vertical rock-wall

THE San Francisco Limited sped straight across the Wyoming plains and then wound tortuously through the Rocky Mountain foothills. In the diner a Man-of-Affairs toyed with his breakfast. Restlessly he glanced out of the window.

"What an ugly country! Rock-walls, dead pines, gnarled sage, cactus, rattlesnakes—what a horrible country!"

Far back from the railroad a bronzed cowboy, tired of chasing dogies, drew in his cayuse, uncinched the saddle and tossed it beside a cactus clump. He glanced about the familiar landscape. He knew the wilderness better than the Man-of-Affairs. Suddenly an unfamiliar note came to his ears. "Bird or beast?" murmured the cowboy. Then came a creepy, raspy sound and apprehensively he drew his foot away. The pony pricked his ears. "Rattler, I guess," muttered the cowpuncher, and then silence.

He had not rightly located the ventriloquial note. His keen eyes swept across the shale-crest toward the winding, broken rock-wall. It was then that he caught a glimpse of a gray bird diving swiftly across a corner of the rocks. "Must be some kind o' sparrer," mused the man. No bird-lover was he, of course, or he would have remembered the come-and-go house wren of his New Hampshire home. Had he thought of this, the likeness would have impressed him at once. But one thing, at least, had come to him: a schoolboy knowledge of rock wrens. Yet, when he found a nook between two sand-rocks where a dozen bits of shale were piled he dismissed the odd discovery with: "Huh, a wood rat." It was not until he came upon a brood of six grisly young rock wrens some weeks later that the mystery was solved.

As with the house wren in Autumn, faint echoes of summeral song prevail in Winter with the rock wren. Such *sotto* sounding continues until Spring is slowly thawing her way out. But, thereafter, one may hear some one of the many renditions of the rock wren calls that pleasantly echo along the half-desert stretches of Wyoming. So faint, so delicate, such sounds, that only the experienced ear may catch them.

By mid-May the rock wren will have become an old-timer amid the crags and along the talus. Here one may furtively watch him, with blended skill and intuition, from securest of hiding places. One may find nest-approaches almost anywhere, all neatly paved. Indestructible, these; except through erosion, they may endure for years. And hence, like the monuments of the Cliff Dwellers, they become uninterestingly common.

The paved nest-approaches are often a foot in length. The material used consists, in average, of flat, rounded pebbles up to an inch in diameter blended with sticks and stones. A greater quantity of such material, more broadly placed, will indicate long and continued use. Beneath one pot-hole, four feet above ground, at the foot of a high canyon wall, I once found a full quart of pebbles and short sticks of cedar and sage. The nest itself, in this case, was uniquely made of bark-shreds.

I once found, in northern Wyoming, amid whimsically-castellated masses of sand-rock, the most wonderful bird castle I have ever seen. The mass rested on shattered rock. Beginning far down toward the base of the buttress, the bits and sandstone had been piled, one atop another, exactly like the fabrications of the veritable Cliff Dwellers. The resultant structure rose to the top of the narrow cleft into which the pebbles had been crowded; while a paving of the same sort extended into the cavity just above the cleft. Enough of woody material had been blended into the stony mass to be at least suggestive of the work of wood rats: yet this it certainly was not. While it utterly defied camerizing, and cannot be shown, the castle must have reached a thousand units.

Summer Flowering Bulbs

By VICTOR H. RIES

JUST recently a gardener inquired as to where she might purchase some "Naked Ladies". No, she was not immodest but merely wanted some of the hardy amaryllis, *Lycoris,* which, because of its habit of suddenly sending up a stalk of lavender pink flowers in midsummer, long after its leaves have disappeared, has received a multitude of odd names. *Lycoris* is a most satisfactory hardy summer flowering bulb that may now be purchased from many sources. Although ordinarily planted in full sunlight it has the surprising ability of thriving in shade. One large planting near Cincinnati, Ohio, is among forest trees where it not only thrives but multiplies.

To make up for its own lack of foliage, most gardeners like to place the hardy amaryllis among other perennials whose foliage remains in good condition throughout the season.

Another equally spectacular summer bloomer is the tiger flower, *Tigridia,* also called the Mexican shell blossom, now available at reasonable prices. Although its brilliant white, red, yellow and orange flowers with brightly spotted throats last but a day, there are always more to take their place. Planted in late spring, it will bloom in July and August. The bulbs should be dug before freezing weather and stored like gladiolus or *Tritonia.*

THE AMAZON LILY, A NATIVE OF THE COLOMBIAN ANDES

This plant, with its foot-long leaves and tall flower spikes, stands out from most other garden flowers

Although we often see *Tritonia* at flower shows grown as pot plants, we but seldom see it in gardens. It belongs to the iris family, and, treated the same as gladiolus, produces spikes of flowers eighteen to twenty-four inches high in various shades: orange, yellow, red, lavender, and purple. The smaller flowers make the plant more desirable than gladiolus for many uses. It is hardier, and may be wintered out of doors in our milder sections, if protected with a heavy mulch.

The summer hyacinth, *Galtonia candicans,* from South Africa, is another most useful and striking summer flowering bulb seldom seen in the garden. The spikes of white flowers, borne in mid-summer, are from two to three feet in height. For best effect, these should be planted but a few inches apart. They are not as hardy as many garden flowers, and should be well mulched over winter, although some gardeners prefer to dig them and store them indoors in dry sand or dry peat moss. Since their own foliage is none too profuse, they are best planted back of columbines, day lilies, gaillardias, coreopsis or similar plants.

The old-fashioned pink oxalis, *Oxalis bowieana,* is surprisingly satisfactory as a summer flowering bulb. Set

A SINGLE SPIKE OF THE HARDY AMARYLLIS

One can well imagine the glorious sight presented by a bank of these flowers in full bloom

THE HARDY BEGONIA, A NEGLECTED PLANT

An asset to any garden, hardy begonia seeds and plants are available from but few sources

out in late spring, it produces a mass of dark green foliage that remains in good condition all summer. Unless you are in the habit of giving plants away, however, you will soon have more than you know what to do with, as it multiplies rapidly. A few bulbs may be planted in the rock garden, or above or in a rock wall. They are also used for borders.

Those who have driven across the Everglades will recognize, and all will enjoy, the spider lily, *Hymenocallis,* with its amaryllis-like foliage and large white spider-like flowers. Being a southerner, it must be planted after danger of frost for summer bloom, and stored with the dahlias over winter. Somewhat similar and treated the same is the Amazon lily, *Eucharis,* from Colombia. The foliage somewhat resembles that of the large-leaf plantain lily. The white flowers are borne in clusters well above the foliage. Partial shade may prove beneficial in many localities.

Nor should we overlook one of the most spectacular of all summer blooming bulbs, the tuberous begonias. Their one demand, protection from the hot sun, makes them supreme for cool, shady spots where but few flowering plants will give us summer bloom. Although the dormant tubers may be purchased and started indoors in March or April, at least one big begonia specialist in the country is featuring growing plants in three-inch pots. These are seedlings started early in the winter and will be ready to bloom when purchased after the last frost. Many varieties of different forms and colors are available. If planted in a bed of half leaf mold or peat moss they will bloom until frost. Once you try them, you will always want them.

This entire article could well have been devoted to the summer flowering lilies, so great are their variety and charm. And yet, despite the complete satisfaction obtained from most lilies, we seldom see any except the most common in gardens, possibly because of their initial cost. If but one or two bulbs of one kind are purchased each season, a fine bed of lilies will be established in a few years.

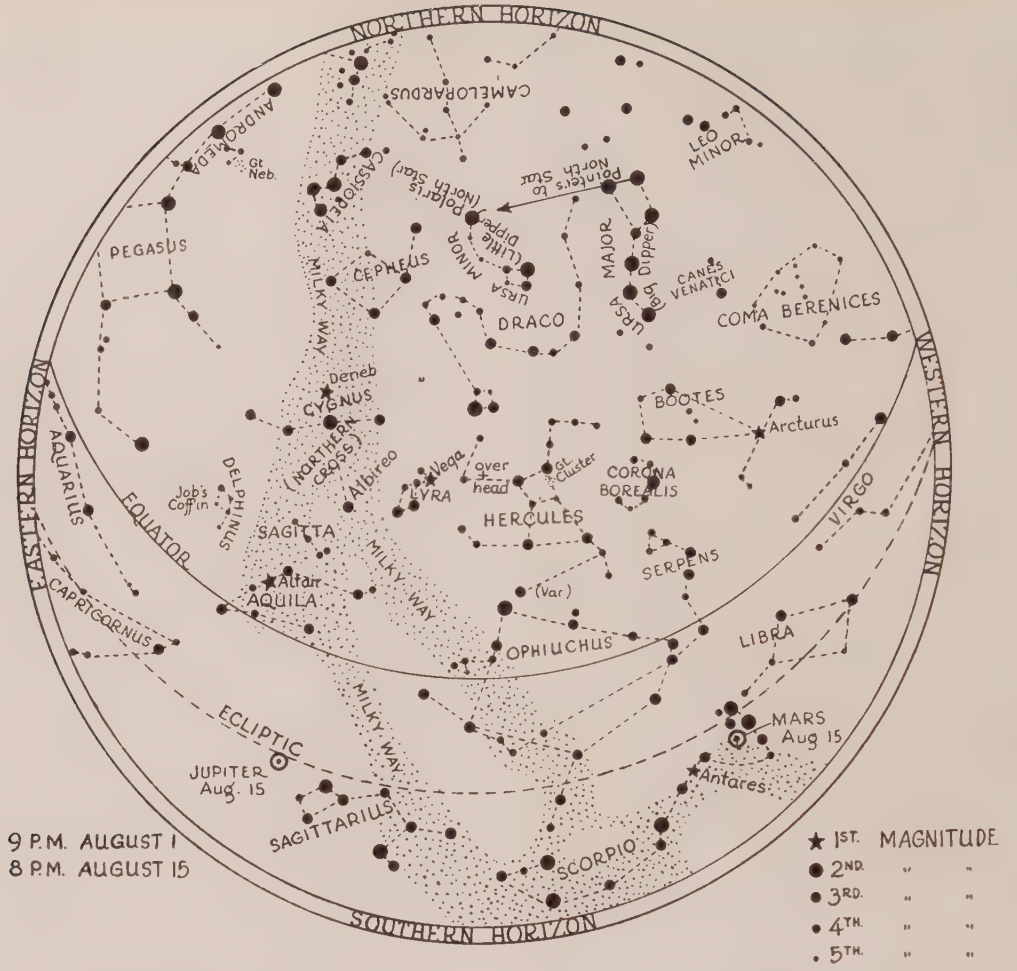
Although the Japanese lilies tempt the beginner, largely because of the size of their bulbs, they are usually not so permanent as the American, European, and Asiatic forms. Nevertheless, *Lilium auratum* and its varieties, and *Lilium speciosum,* have glorious flowers and are worthy of trial. You may have just the spot for them to become established and multiply.

Every one knows the tiger lily, the regal lily and the madonna lily; but few, however, realize the hardiness of *Lilium henryi* and *L. hansoni* or are trying, either from seed or bulbs, *L. philippinense formosanum* with its many varying forms. But few have been tempted by *L. concolor, L. chalcedonicum, L. martagon, L. humboldtii, L. testaceum, L. washingtonianum, L. willmottiae,* or dozens of others. If expense is a limiting factor and time is not, practically all of them may be raised from seed to bloom in from two to five years, depending on the species and the care one can give to it.

The old-fashioned tuberose seems to be staging a come-back, for even the five-and-ten cent stores sell them now. It is a tender plant, and should be set out in late spring, to bloom until frost, and then dug up. For best results the clumps should be divided every year or two and well fertilized when planted. Their fragrance will scent the entire garden, and their showy spikes of blooms will adorn many flower arrangements throughout the summer.

Although the many forms of *Gladiolus* make a story by themselves, may we suggest planting them every two weeks from early spring (March 1 in the latitude of New York City) until July 1. In this way *Gladiolus* will be in bloom from early July to freezing weather. In milder climates the *G. primulinus* varieties often will winter successfully outdoors, or if planted up against the cellar wall may even winter in the colder sections. Even dahlias and cannas planted against an outside chimney have been known to winter successfully where temperatures drop to fifteen degrees below zero. Although this is possible, it is not guaranteed to work under all conditions.

It is all very well to discuss all these different summer flowering bulbs, but unless we have an idea as to where they can be planted it is rather useless to buy them. Since most of them, except for the lilies, are tender and have to be taken up every fall, it gives one a chance to replant them in bare spots around the yard. Many, like *Gladiolus, Tigridia* and *Tritonia,* may be planted among the other perennials for (Continued on page 121)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

MY FIRST VIEW OF THE SOUTHERN CROSS

By ISABEL M. LEWIS

It was at Quito that I first saw the Southern Cross. When I left Miami by plane for Peru, five days before, one of the things that I had anticipated almost as eagerly as the eclipse, which was the purpose of the trip, was the opportunity to see the constellations of the Southern Hemisphere, above all the far-famed Crux, or Southern Cross. Even if the eclipse expedition should prove to be unsuccessful I would at least have the memory of the southern constellations to carry back with me, the beauty of the southern regions of the Milky Way, and the topsy-turvy appearance of our familiar northern constellations as seen from a position south of the equator.

One may, to be sure, see the Southern Cross low in the southern sky in Miami, but conditions were not favorable for its observation on my one overnight stop, for which I was not sorry, as I wanted to see it first under better conditions. It has been said that the feeling of disappointment that so many people from the north have upon seeing the Southern Cross for the first time arises from the fact that they usually see it when it lies near the southern horizon and is not well placed for observation. I wanted to get my first view of the Southern Cross under conditions that would not put it at a disadvantage.

The first night out of Miami, due to a delay in schedule that I did not regret since it gave me the opportunity to stop at two places I would not otherwise have seen, was spent at Kingston, Jamaica. I do not recall seeing a single star in the evening sky there. We were up before four A.M. to get an early start, and on the way to the harbor an hour later a moon just past the full bathed land and sea in a radiance that blotted out the light of all but the brightest stars and the four planets: Venus and Saturn in the east, Jupiter high in the west and Mars about to set. Venus was near her greatest brilliancy and it was a scene never to be forgotten, but the Southern Cross was in the evening sky and had set some hours earlier. We winged away from Jamaica as the splendor of moon and planets was dimmed by the glow of the rising sun in the east, and the next night we made another off-schedule stop at Cartagena, Colombia, oldest town in South

America, where the Southern Cross again eluded me.

At Guayaquil, Ecuador, it was cloudy. At six A.M., for trains, as well as planes, start with the sun in South America, I was to start by train from Guayaquil on that two day climb to Quito, on the equator, 9000 feet above the sea, said to be the most picturesque city in the world. The highest point on the first day was reached at Palmira at an elevation of 10,626 feet, and the night was spent at Riobamba, a little over 9000 feet above sea-level. The scenery on this trip was one of unimaginable grandeur, and as one must be up at five again for another early start, there was again no time for star gazing. The following day the highest elevation is reached as the train skirts the base of snow-capped Chimborazo at a height of 11,841 feet, and soon the snow-crowned volcanoes, Cotopaxi, Altar, Tunguaragua, and others come into view, one in the far distance mildly in eruption. Indians wearing their colorful ponchos and riding either patient little burros or small ponies are seen everywhere, halting to watch the train pass or gathering in the market places.

It is late on the second day when we arrive at Quito. Although we are on the equator, the air feels like that of a cool spring or autumn day and one is glad to have a warm wrap to put on. The hotel room is chilly; a wood fire such as we had at Riobamba would feel good. It is nearly seven and it is dark, though it is the 29th of May, for the sun sets at, or close to, six o'clock the year around at the equator and the twilight is short.

Quito is a city of churches, and the ringing of bells seems almost ceaseless as they all chime the quarter hours throughout the day and night. The bells are chiming as I decide to open the doors of my room that lead to one of the little iron balconies so characteristic of the Spanish type of architecture seen everywhere in South America. As I step out upon the balcony, the first object upon which my eye rests is the Southern Cross high in the heavens, clearly defined and beautiful, embedded in the Milky Way and attended on the east by the magnificent pair, Alpha and Beta Centauri, reminding one somewhat of Castor and Pollux in Gemini, but far more brilliant and impressive. Then, suddenly and almost simultaneously with my recognition of the presence of the Southern Cross, a brilliant meteor flashes through Centaurus travelling in a southeasterly direction, yellowish in color, fully as bright as Jupiter and with a bright trail fully ten degrees long. I am both surprised and delighted at the coincidence and watch hopefully for more, but it is the only meteor I am to see on the entire trip.

The Cross was not disappointing to me. It was at that time in upright position close to the meridian, and as I was on the equator it was at an altitude of about thirty degrees above the southern horizon. It was even larger in size than I had anticipated, and later, when I saw it under even more favorable circumstances in Peru, I compared it with Corvus, which I had estimated would about equal it in size. In latitude eight or ten degrees south, Corvus is only a few degrees from the zenith when the Southern Cross is near the meridian, and the two constellations are easily compared.

If it were not for the beauty of its setting in the Milky Way, particularly bright and interesting in structure in this region, with a dark Coal Sack adjacent to Crux on the east, or for the splendor of nearby Alpha and Beta Centauri, it is doubtful whether the Southern Cross would appear quite as splendid as it does. Beautiful though it is, one cannot but wish that Delta Crucis, the farthest west of the four stars that outline the Cross, was more nearly equal in brightness to the other three stars. Alpha Crucis is a magnificent double star consisting of two stars of second magnitude and is the farthest south of the four stars. Gamma Crucis, opposite to it, also is a double star of second magnitude and Beta Crucis, farthest east of the four, is of one and a half magnitude. Delta Crucis is a star of third magnitude and so is noticeably inferior in brightness to the other three stars. This detracts from the splendor of the Cross to some extent.

Leo at this time of year assumes a strange appearance to the northern visitor to Peru, for he stands on his head in a most undignified manner. The time of which we have been writing was the last week in May and first in June, when the Southern Cross is near the meridian in the early evening; Leo, Virgo, and Bootes are to the north, Scorpio is magnificently placed high in the east, and Argo Navis, with its blue-white Canopus, is a huge and brilliant constellation in the southwest. High across the southern sky runs the beautiful but unfamiliar southern Milky Way from Scorpio through Centaurus and the Southern Cross to Argo.

We turn now to our northern heavens in the month of August to find our familiar Northern Cross in Cygnus, high in the east along the Milky Way. In the south are Scorpio and Sagittarius, not far above the horizon. Jupiter is in Sagittarius this month and visible most of the night. Mars passes from Libra through Scorpio into Ophiuchus and by the end of the month is close to Antares, passing north of it. Saturn is now in Pisces and rises late in the evening the early part of the month. Mercury will be at its greatest eastern elongation on August 18 and for a few days before and after that date may possibly be seen in the west after sunset. Venus continues to be a Morning Star and is resplendent in the east before sunrise.

This is the month, also, for the periodic return of the meteoric shower known as The Perseids. Members of this swarm should appear in greatest numbers between August 10 and 12 though they may be seen on almost any night during July and August.

Nature Magazine in School

A Department of Aid to the Teacher

Plant Acrobats

In the lazy days of August, when your child has time to do some real observing, his attention could be called to the various types of climbing plants to be found in his own garden, a vacant lot or woodland. He might make a collection of pressed leaves, stems, roots and fruits used for climbing purposes. To present a neat appearance, these should be pressed between the sheets of a newspaper laid on a flat surface. A board weighted down with stones should be placed on top. When the plants are fresh and full of moisture, the newspapers should be changed every day. Later, when the specimens are mounted in a scrapbook, notes can be written under each giving the name of the plant, the place where it grew and an explanation of how it climbed. Drawings and photographs can be added to the book. Experiments can be performed to give convincing proof of the circular motion used by plant climbers in seeking to gain a foothold by which to raise themselves. A simple one is to place a sheet of paper under the tendril or other part of the plant under observation and at regular intervals mark on this paper the position of the moving part.

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Bird Calling as a Hobby

Have you ever wished that you could bring some hidden songster out into the open where you could get a good look at him? This article, with its careful description of calls used to attract birds, will tell you and your child just how this is done. Two accomplishments might be cultivated at the same time, one of attracting birds by imitating their calls, the other of recognizing them by their song. In the latter connection, Schuyler Mathews' book, *Field Book of Wild Birds and their Music* would be quite helpful.

Since children enjoy action, they would feel near indeed to the heart of Nature if they could call the wild birds out of their hiding places. Let your child participate in bird calling exercises and perhaps build a blind, behind which he can hide while he calls and watches for the birds to respond.

Chapman, in his *Handbook of birds of North America,* describes an umbrella blind. A cooler type may be built out of small sticks, log cabin style, and covered with leaves.

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Congo Bongo

This is a most interesting story of the capture of a rare wild animal. It is full of the spirit of discovery and is the type of story that tends to interest children in things of a scientific nature. Encourage your child to read it and to save this article to take to school in the fall. Teachers will find it useful in connection with units dealing with Africa.

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science Washington, D. C., Schools

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Pymatuning Swamp

What an inspiring place for conservationists to visit! What a delightful motor trip could be arranged with this as an objective! Would not the children love it? Some of them would want to make a scrapbook in which leaves were pasted, and drawings, colored outlines, occasional descriptions and perhaps a poem or two were added to give some idea of the variety of living things and their habits. Coloring outline pictures of birds and wild flowers appeals to most children, so these outlines and crayons are important articles to pack. Lists of birds recognized along the roadside could be compared with the list of birds found in and near the sanctuary. Such resolutions could be made as, "Someday when I grow up, I will see that our state sets aside land for wildlife refuges." On the return home parents could impress this idea upon their children by discussing the possible locations in the State for sanctuaries, the reasons for these locations and the ways of educating the public to demand them.

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Soup Personified

This article giving intimate, first-hand information about the diamond-back terrapin would be interesting reading for a child who already had a pet turtle. Among the wild creatures available for study by the young child, none surpass the turtle in popularity. It is easy to find, easy to catch and easy to handle. It is quite safe to pick up if one is careful to grasp the shell far enough back to be out of the way of the mouth. Turtles have no teeth but the bony ridge of the jaws is just as effective. They will thrive on a diet of hamburger and fresh vegetables, and they are easy animals for which to provide living quarters. Just remember that land turtles need water and water turtles require some land. The former may be made to feel at home in a box in which there is moist earth covered with moss. In one section of this green "lawn", a shallow dish of water should be sunk to form a bathing pool large enough to accommodate the turtle. On the other hand, water turtles should have a rock or other object projecting above the water in such a way that they may come out of the water to sun themselves when they so desire.

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Town Forests Pay

Many families motoring along the Atlantic seacoast will drive through the state of Massachusetts. If there are children in the party, it would be quite worthwhile from an educational standpoint to visit one or more of these town forests. A report of such a municipal undertaking would be welcomed at school next fall. Teachers are always looking for "leads" from their pupils and so a whole unit of study pertaining to forest life might result from such an introduction. Materials and pictures collected in the forest would enhance such a report. Leaves of several kinds of trees can be picked up and pressed between the pages of an old telephone book until a more convenient time arrives to mount them. Collections can be made of fruits of some of the trees, and picture post cards or kodak pictures of the forest. First-hand reports of any observations of wildlife seen in the forest, as well as a statement of the economic value of the forest, should be made. Next fall, as a result of his talk to his fellow pupils, your child may be responsible for setting at work forces that will ultimately result in the establishment of a town forest in your own community.

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Yellowstone Wolves

This is an adventure story, a type so valuable in interesting children in natural history. Those who are fortunate enough to visit Yellowstone will find themselves looking for wolf tracks in the soft mud of watering places where animals come to drink. The story of the wolf in *Wild Animals I Have Known,* by Ernest Thompson Seton, also describes the habits of this animal and gives one a feeling of sympathy for this huge wild dog. The wolf is near extermination and in the scheme of Nature and the web of life he may serve a more important purpose than we at this time realize.

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The Gardener's Second Year

Published as a sequel to Alfred Bates' *The Gardener's First Year,* this volume, by the same author, is a practical guide for the developing gardener and strives to awake in him an interest in plants through an introduction to the knowledge of botany that every real gardener needs in his work. The book deals with herbs, which includes perennials and bulbs, discussing their care, winter protection, diseases and pests, and propagation. Through this volume the gardener is led to the "third year" which will deal with shrubs and trees. Priced at $2.00, the book is available from Longmans Green and Company, New York City.

Elementary Science Teaching

An excellent volume that should go far toward the modernization of science teaching methods is *Science in the Elementary School,* written as one of the McGraw-Hill Series in Education by Professor W. C. Croxton of the State Teachers College at St. Cloud, Minnesota. The McGraw-Hill series is designed primarily to provide textbooks for use in professional courses for the preparation of school teachers and other workers in the field of education. In his book, Professor Croxton has written for the elementary teacher who desires to be professional in the modern sense, and for such a teacher he has provided an inspiring theoretical basis for the teaching of elementary science as well as a wealth of detailed source material for classroom use. More than half of the book is an activity source book, in which suggestions for an activity program for the school year are presented. These are divided into appropriate groupings for work in the autumn, winter and spring of the school term, and contain information on establishing Nature trails, keeping Nature calendars, establishing school museums, and scores of other interesting and instructive activities that should be a part of every school's curriculum. The McGraw-Hill Book Company, New York City, is the publisher, and the book is priced at $3.00.

Man in a Chemical World

An absorbing volume with the above title has been written by A. Cressy Morrison. In this book man's utter dependence on the chemical industry for his existence as a civilized being is pointed out. The book, which is, in short, a biography of that industry, brings out the fact that Nature, the greatest chemist of all, has pointed the way to the scientist who studies and understands her methods, and he, therefore, is able to emulate or change her products, and create new substances, or better adapt natural materials to man's use. Publication of the volume is the final act of the Chemical Industries Tercentenary Committee in the completion of the celebration of three centuries of achievement by chemical industries in America. The chemists have gone far in making our lives happier and more livable, but there is one job they have yet to do: that of effectively denaturing poisonous factory by-products before they are dumped heedlessly into our rivers and streams, to pollute the waters and destroy millions of fish yearly. The volume, published by Charles Scribner's Sons, New York, is available for $3.00.

All About the Dachshund

Orange Judd Publishing Company, New York, announce publication of *The Dachshund,* a 400-page volume by Herbert Sanborn, one of the best known authorities on this breed of dog, who began his studies in Germany some thirty years ago. Complete with historical data, breeding methods, training, care and a discussion of diseases and their treatment, the book will furnish English-speaking breeders with information necessary for an intelligent and successful breeding program. *The Dachshund* is available from the publishers for $3.00.

SUMMER FLOWERING BULBS

(Continued from page 117)

mid-summer bloom. Or they may be spotted in groups among the annuals, in the back of the rock garden, or among low-growing shrubs. Often the tuberous begonias may be planted above the tulips and daffodils, provided they are in a shaded place.

The lilies are ideal for spotting here and there among the shrubs, low evergreens or in the flower border. A few, like the pink oxalis and spider lily, may be grown as pot plants in tubs or pots. But do not forget where you have the various tender ones planted so you can be sure to dig them before freezing weather, or in the case of *Tritonia* and summer hyacinth, mulch them heavily for winter protection.

There are many other summer flowering bulbs such as the onion, *Allium,* Mariposa lily, *Calochortus,* and *Anemone coronarius,* that may be found by hunting through the catalogs. Many may be purchased as bulbs, others only as seeds. Some will be satisfactory in your particular climate, others will not. But that is half the fun of gardening—actually growing those things that supposedly won't grow in your climate. The other half of the joy is growing the less common plants that no one else in town has, trying something new, something different, being thrilled with success but not disappointed with failure.

The best of it is that you can keep this up all your life and not exhaust the possibilities of gardening as a hobby.

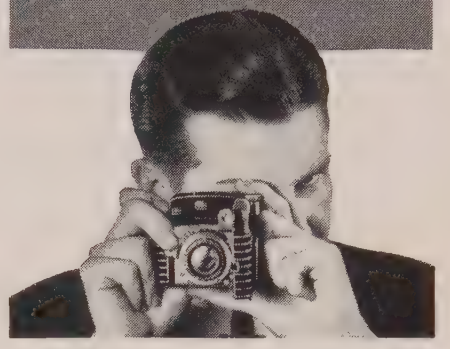
Nature Poetry Contest

Once again the Chattanooga Writer's Club announces the annual Nature Poem Contest for the Elberta Clark Walker Memorial Prize. The contest closes January 1, 1938, when prizes of ten and five dollars will be awarded for the two best Nature poems submitted. The poems must be original and unpublished, not exceeding seventy-two lines in length; must be submitted anonymously, accompanied by the name and address of the contestant in a sealed envelope identified with the title of the poem written thereon. Only one poem may be submitted by each contestant. Submission should be made to Miss Terrell Tatum, University of Chattanooga, Chattanooga, Tennessee. Poetry lovers will be interested to know that a book containing the prize-winning poems submitted in this contest during the past twelve years is shortly to be published by Mathis, Van Nort and Company, Dallas, Texas.

Correction

In our June issue we carried a brief note descriptive of an archeological and ethnoconchological project at New Orleans. This we described as a PWA project, unfortunately transposing initials that should have read WPA. In other words, the Works Progress Administration is the Federal agency concerned, and is collaborating with the Louisiana State Museum in the program.

Gets the pictures that won't wait



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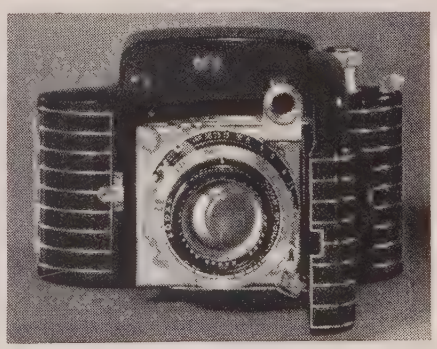

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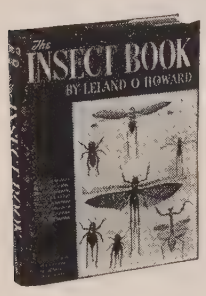

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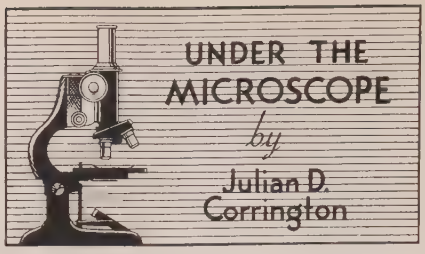


With this issue, NATURE MAGAZINE introduces a new monthly feature for those of its readers interested in the microscope and its widespread uses. It is our plan to present items on the parts and construction of microscopes and accessories, things to do with your instrument and things to make for it; seasonal activities; a primer for beginners and advanced notes for those past the elementary stage; trade hints and interesting facts and personalities connected with the historical development of the microscope and those sciences in which it is the supremely essential tool. The editor of this department is Dr. Julian D. Corrington, Professor of Biology in Washington College, Chestertown, Maryland; author of *Adventures With the Microscope* and of more than sixty articles on amateur microscopy appearing in a number of publications, including NATURE MAGAZINE.

* * *

SUMMERTIME IN THE MICROCOSM

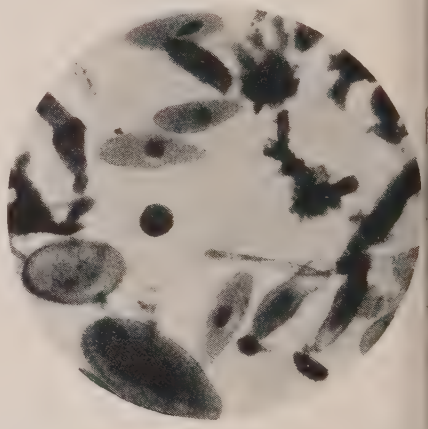
That word *microcosm* is a mighty handy one, even though of technical origin, and we shall doubtless use it frequently. It designates the world of the infinitely little—that great universe of microscopic beings which are all about and around us, though most of us never suspect their presence until we purchase a microscope and begin to explore the fascinating wonders of this hidden level of life.

There are the one-celled plants termed Algae, of which the enormously varied, abundant and widespread group of Diatoms make up a considerable part and which are more beloved of the amateur microscopist than probably any other assemblage of organisms. Details about diatoms later. Many algae are colonial, producing chains or plates or balls of cells. *Spirogyra*, for example, is a chain type of colony universally studied in biology and botany courses. Certain Fungi, as the water mold, *Saprolegnia*, occur in the microcosm too, not to mention numberless bacteria of both harmful and innocuous types.

Among animals there are the Protozoa, whose entire bodies consist of but a single cell, as with the well known *Amœba* or *Paramecium*, and there are higher or many-celled animals of minute size. Such are the Rotifers or Wheel Animalcules, certain species of the several different groups of worms, and tiny relatives of the shrimp and lobster that are known collectively as the microcrustacea, including *Daphnia*, *Cyclops* and others. Then there are the hosts of reproductive cells; spores and zoöspores, pollen grains and gametes or sex cells.

All of these except pollen grains are to be encountered in pond water and constitute the Freshwater Microcosm. But there is an Atmospheric Microcosm too, with objects so small and so light that they float among the particles of soil and debris which we lump together under the name "dust" for want of a more exact term. Here will be found pollen grains in great variety, and some of the water dwellers, as bacteria and protozoa, in an encysted state, ready to throw off their husks and come to active life again as soon as they fall into a moist and suitable environment.

The Freshwater Microcosm is a fascinating introduction to microscopy, and one highly appropriate for work in summer months. Go out on a hike and take along several small, wide-mouthed bottles. Collect samples from roadside ditches, pools, and both stagnant and fresh ponds. The vicinity of water lily leaves is an excellent site, and several people have reported that the water and old leaves that accumulate in the bottoms of gatepost and cemetery urns simply reek with Protozoa. Collect by placing the stoppered bottle under water, removing the cork when the bottle is opposite the place from which the culture is desired. This should usually be on the bottom of the pool or against the under surface of a lily leaf as the inrushing water will carry muck and vegetable debris with it. Poke in some soil and decayed leaf material with a finger, then replace the cork, bring the bottle to the surface and label it immediately as to date and location.



SOME OF THE AMAZING KINDS OF ANIMALS FOUND IN A DROP OF POND WATER. THE IRREGULAR CREATURES ARE AMOEBA: THE SLIPPER-SHAPED ONES PARAMECIUM

At home again, remove the corks and cover each bottle with a square of gauze, secured around the bottle neck with a rubber band; this admits oxygen to the living contents. Use a separate pipette (dropper) for each bottle, so as to prevent contaminating the contents of one bottle with that of another. Mount two drops of fluid upon a clean blank slide, being sure to include a bit of the fine muck and debris from the bottom of the culture. Do not have too much of this solid material, however, so that the mixture is at all thick or dark in color—just a bit is sufficient. Add a cover glass and study first under low power and then high power. If you find nothing the first time, try another mount or another culture.

Avoid letting a good slide dry out. This may be prevented by the occasional addition of another drop from the same bottle, placed on the slide just at the edge of the cover glass so that it will touch the fluid under the cover and be drawn in under by capillary attraction, without wetting the top of the cover. Always wash and wipe clean and dry all slides and covers, instruments and glassware after you have finished a given exam-

ination or study. Keep everything clean and in its proper receptacle.

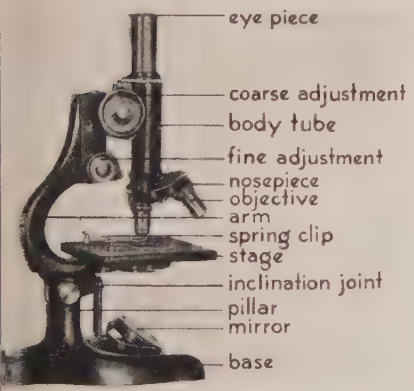
To identify what you find in these cultures and to read up about the denizens of the microcosm, see one or more of the following references: Corrington, "Adventures With the Microscope," Chapters V, VI, VIII. Corrington, "Tracking Microcosmic Giants," Nature Magazine, June, 1935. Needham and Needham, "Guide to the Study of Freshwater Biology." Ward and Whipple, "Freshwater Biology."

* * *

HINTS TO THE ADVANCED STUDENT

In studying ciliates such as *Paramecium*, add powdered carmine (rouge will do) to the water and watch the formation of food vacuoles in the gullet during the feeding process. These colored particles will also demonstrate *cyclosis*, the circulatory pathway followed by these transient stomachs during digestion. Try an *intra vitam* dye, such as Neutral Red, which stains without killing. To use this dye, make a 1% solution of the dry powder in distilled water, then add merely one drop of this solution to half a tumblerful of distilled water. Now use only one drop of this second and very highly diluted mixture to add to your culture—it's amazing that such a thin solution would stain at all—but it does. Allowing a very small droplet of iodine solution to run under the edge of the cover glass will kill the paramecia, stain their nuclei and cause them to discharge trichocysts, their defensive armament of tangled threads.

* * *



THE PARTS OF A COMPOUND MICROSCOPE

PRIMER FOR BEGINNERS

What is a microscope? The answer is somewhat of a surprise, since we are accustomed to associate this word with the familiar picture of the laboratory instrument seen in the schoolroom or in magazine ads for tooth pastes, drugs and food products. Fact is a microscope is any form of device that enables one to see objects more clearly by means of an enlarged image; hence a telescope is technically a microscope. So also are ordinary spectacles and a host of magnifying glasses which are variously termed reading glasses, hand lenses, hand magnifiers, linen testers and so on. *Simple* microscopes employ a single lens or a combination of lenses placed close together and known as a single *lens system*; a *compound* microscope uses two systems, placed relatively far apart. If you own a compound microscope or intend securing one in the near future so as to join our department and go along on our journeys into wonderland, your first task will be to learn the names for the parts of a microscope and how each part is used.

* * *

TRADE NOTES

The Bausch and Lomb Optical Company, Rochester, N. Y., has issued an illustrated folder entitled "Microscope Equipment for the Amateur" which shows and describes microscopes, instruction books, slide-making kits, photomicrographic and microprojection equipment. A useful catalog for the beginner or elementary student. Send a three-cent stamp to NATURE MAGAZINE for a copy, which will be mailed to you promptly.

Advanced devotees of microscopy should build up their scientific libraries with careful selection and discrimination. This department anticipates being of service by reviewing or recommending only books of real merit, and here is an important starter. One of the standard works on microscopy that has been most influential in building up the subject into a science is "The Microscope," by Professor Simon Henry Gage, dean of American microscopists. The latest edition is the sixteenth, issued in 1936; a fact which alone testifies amply to the eminence of this book, known wherever the microscope is used.

This is a large volume, going thoroughly into the technicalities of optics and microtechnique; microscopes, kinds, construction and history; accessories, drawing and projection, photography and many other matters. The new edition has special chapters on the ultra-violet microscope and microincineration. Not recommended for the beginner, but essential to every advanced worker. Comstock Publishing Co., Inc., Ithaca, N. Y. $4.00.

Elementary texts in the several sciences are necessary for background and materials, and we intend mentioning numbers of these from time to time. An excellent survey work on animal biology is the "Textbook of General Zoology," by Curtis and Guthrie. John Wiley & Sons, Inc., 440 Fourth Ave., New York City. $3.75.

Should one wish a more general work, covering the laws and principles of life as exhibited by either or both plant and animal, a biology text is indicated. Among those designed for college freshmen, but so well written that it can be fully understood and used with pleasure by any educated person is Prof. L. L. Woodruff's well known "Foundations of Biology," now in its fifth edition. Highly recommended. The Macmillan Co., 60 Fifth Ave., New York City. $3.50.

Under the Microscope is a department of NATURE MAGAZINE designed for those readers interested in microscopy and maintains a service to render assistance with problems in this field. You are invited to take advantage of this service. Address all inquiries to Julian D. Corrington, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington, D. C.

Sincerely,
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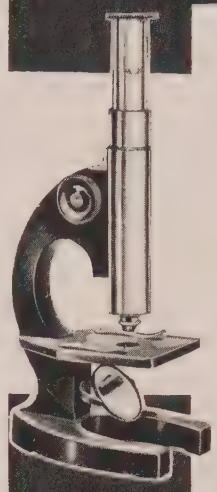

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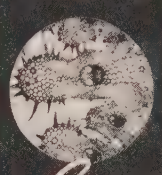

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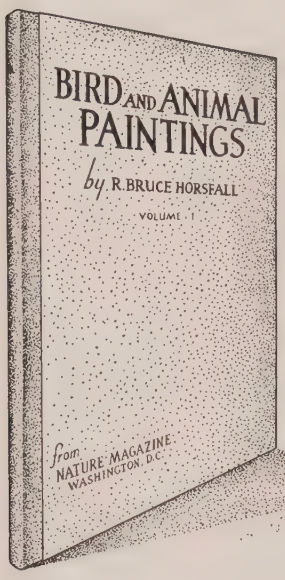

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Have you not often wished for an accurate source of information about the name of a bird or animal or insect? On a walk, a camping trip, or while exploring new country, how often arises the question "What is it?" An animal flashing through the underbrush or scampering across the trail instantly arouses one's curiosity. For lovers of nature who wish to become familiar with the various species of wild life in this country, we offer a valuable aid and a genuine bargain in this book.

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Not only for active nature enthusiasts but also for stay-at-home trips through fields and forests, scarcely anything can surpass this book. A browse through it will make a rainy day or a Sunday afternoon pass like magic. Contains 168 full color paintings. Each picture is accompanied by a concise description of the character and habits of the subject. The scientific name is given in each case. Teachers will find many uses for the book in the study of natural science and geography.

Despite the high cost of color plates and printing, this beautifully printed, 58-page book, with its many pictures, is offered to readers of Nature Magazine at only $1.50 a copy. Send your order with remittance to

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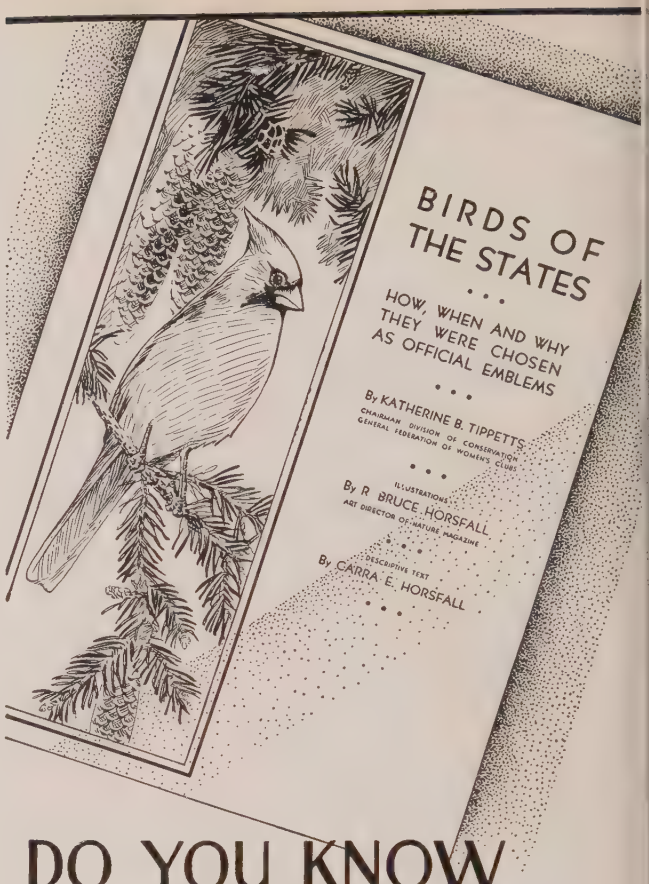
BIRDS OF THE STATES
HOW, WHEN AND WHY THEY WERE CHOSEN AS OFFICIAL EMBLEMS
By KATHERINE B. TIPPETTS
CHAIRMAN DIVISION OF CONSERVATION GENERAL FEDERATION OF WOMEN'S CLUBS
ILLUSTRATIONS By R. BRUCE HORSFALL
ART DIRECTOR OF NATURE MAGAZINE
DESCRIPTIVE TEXT By CARRA E. HORSFALL

DO YOU KNOW The Bird of Your State?

or of the 42 other states that have adopted official birds?

The movement to select an official bird emblem for ever state only recently was launched as a nation-wide move ment. Some of course had adopted official birds earlier Altogether, 43 states have now selected a bird to represen them as an emblem.

The fascinating story of how, when and why the variou states selected the birds to represent them is told in this book by Katherine B. Tippets, Chairman, Division of Conserva tion, General Federation of Women's Clubs. Illustratin the book are 30 full color paintings of the various bird by R. Bruce Horsfall, the famous wild life painter, wit descriptive text by Carra E. Horsfall.

Every home and every school should have this book. It i a fascinating bit of history combined with an authentic and interesting survey of the birds of America. A handy table ir the front lists the birds together with the official flowers o the states.

The 16-page book, with 30 illustrations, is offered to readers of Nature Magazine at 50 cents a copy. On orders for ten or more copies, the price is 25 cents a copy.

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Diana Thorne's DOG COLUMN

THE POODLE, the clown of dogdom, has become inextricably associated with France, although it is doubtful if that is the country of origin of the dog we see today.

His quick-wittedness and his docility and aptitude in training have made him the favorite of the dog-act troupers and the circus. But a clown is not a fool; nor is a poodle! Neither is he the dandy that his dress suggests; nor is he only comfortable or happy as a house-ornament. He is an excellent all-round dog in the field. He has keen scent and keen vision; he is an excellent swimmer, and a good retriever. As a truffle-hunter he is ranked second only to the pig in Europe, and he has the advantage over the pig of being tractable, intelligent and co-operative!

He is considered to be the equal of any other breed as a house-dog. He is devoted and loyal. He is not a roamer. He is hardy and easily reared and seldom requires vetting. Exceptionally quick in the understanding and application of human sounds, he is easily the perfect type for training to the spoken word. His ability to memorize a considerable vocabulary is uncanny.

A poodle attached to me some years ago (a devoted, merry and wise companion until our association ended by the intervention of a hit-and-run driver) had a whole repertory of accomplishments. He could open any door that was latched but not locked. His efforts (to the last) to master the knack of turning a key with his teeth were amusing. He did a great deal of local shopping for me and carried packages with aplomb and care. Afternoon "teas" to which visitors came were always a source of satisfaction to him, for he was a born showman and master of ceremonies and also served to prevent many an awkward and boring moment. I have had a good many dogs who were friend-makers but never one who exceeded "Jolli" in this respect.

He could do almost anything but speak, and his efforts to talk to us in his own way were negatived only by our own limitations in understanding what he tried to convey to us. But much of what he conveyed by tone, expression and pantomime we did understand!

Given a message in an envelope and told, "Take this to Mrs. T——" he would cover the two miles to the lady's residence repeatedly and in quick time; never once making an error in his objective, or being inveigled on his journey by canine gossips, or intrigued by unusual happenings on the way. So much cannot always be said for the average boy; albeit many dogs of various breeds rank with the poodle in this quality of attention and single-mindedness.

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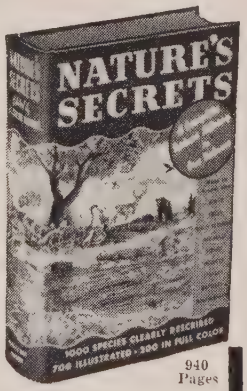

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mands in his coat a fancy trimming. Without this he would be easily mistaken for the old English water-spaniel. Not that this or any error in identity would worry the poodle, for he is an extreme individualist and capable of taking care of himself in any situation!

"Poodle is as Poodle does" might indeed be his motto and standard of behavior.

He is, to a great extent, one of those known as a "one-man" dog, implying that he suffers loss and melancholy under a second owner, and that the allegiance and obedience given to the first is not accorded to another. This is not entirely true. But more so than many dogs of mercurial temperament, such as, for instance, the riotous fox-terrier, he is apt to suffer in spirit through bereavement of the first person to train or care for him.

Answers to "A Garden Party Game"

1. Solomon's Seal; 2. Star-of-Bethlehem; 3. Four o'Clock; 4. Canterbury Bells; 5. Jack-in-the-pulpit; 6. Poppy; 7. Queen Ann's Lace; 8. Foxgloves; 9. Mock-Orange; 10. Dutchman's Breeches; 11. Sweet Alyssum; 12. Rose, Lily, Myrtle, etc.; 13. Dandelion; 14. Lady Aster; 15. Bachelor's Button; 16. Bouncing Bet; 17. Phlox; 18. Snowball; 19. Chinese; 20. Butter-and-Eggs; 21. Bittersweet; 22. Lady-Slippers; 23. Squirrel Corn; 24. Everlasting.

Nature's Bird Bath

A bird bath that never goes dry has been found by Mrs. Grace Young of Lincoln, Nebraska. This pool is a rounded depression situated in the buttressed roots of an elm tree in Lincoln Park, two miles west of Cowker City, Kansas, and held water even during the dry season. This may be because of the fact that it is on the north side of the tree where the sun's rays do not penetrate directly. The source of the water is not apparent.

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A Gull and a Clam

Leonard G. Wheeler

One bright day in July, 1936, while dreaming on the sand at Jones' Beach, Long Island, I saw two usually drowsy lifeguards suddenly bestir themselves from their meditations, and hastily launching a surfboat, row rapidly in the direction of Africa. I followed their course with my glasses and soon saw that the object of their nautical venture was a floundering herring gull about one-quarter of a mile offshore. It did not seem to be able to get off the water, and after a short chase the guards overtook it and lifted it into the boat. What happened then I could not make out through the glasses, but shortly the gull was released, and it then lost no time in quitting the water for the air.

My curiosity well-aroused by that time, I questioned the guards upon their return. It seemed that the poor gull had a large ocean clam or "skimmer" firmly clamped on its beak, and with this living load had soon become so exhausted that it could not take off.

I know that the gulls feed on these large clams when they are washed up on the beach. Evidently this particular clam had opened in the sun but had still been by no means dead when the gull happened along, poked his beak inside for a clam dinner, and—snap!

The bewildered gull, no doubt, could fly at first with his living trap and took to the ocean. Soon, however, he became too tired to fly, and the clam would under no conditions consider opening with the irritating beak within his portals. It looked bad for both parties until the guards intervened and broke the deadlock.

Bose Transactions Available

Transactions of the Bose Research Institute, Calcutta, Volume X, 1934-1935, is now available from Longmans Green and Company, New York, for $7.20. Among the biological subjects dealt with in this volume are the modifying influence of age on the internal activities of plants, and the effect of continuous and intermittent illuminations on phototropism.

Don't Count the Rattles

Contrary to the long-accepted belief, a rattlesnake's age is not computed by the number of his rattles. A rattler may grow each year from two to four buttons, depending on climate, food and other factors. By the time a dozen have been produced, the older rattles will break off. Although the maximum is usually about twelve, rattlers have been found with as many as 23 buttons.

Out-of-Season Bisons

Three bison calves at Wind Cave National Park, South Dakota, have broken all precedents of bison society, having been born early last winter instead of waiting until spring, as is usually the custom. The first arrived in the midst of a November snow storm, and the next two appeared in early December when the thermometer read 14 below zero. The babies survived the South Dakota winter, apparently thriving on the extreme cold, and can be seen today, roaming the range with the rest of the herd.

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What's in a Name?

By Margaret E. Gross

"The pumpkin is a berry, the raspberry is a cluster of drupelets, and the strawberry is a fleshy receptacle bearing minute, dry achenes," the botany teacher told our class.

With the world thus upset, interest in popular terms versus scientific names was awakened, and I began to investigate further, keeping a list of what I found. I soon decided that this might very well be made into a parlor game, except that very few people would score even once!

Since the strawberry seeds were achenes, I hunted up more achenes and found that the seeds of spinach and beet (which belong to the same family, the goosefoot), rhubarb and buckwheat (buckwheat family), scientifically bore that name. Berries I found to be plentiful. The fruit of the potato, asparagus, apple, pear, tomato, grape, lemon and other citrus fruits were thus classified. A farmer, asked how his berry crop is this year, should think twice before he answers! Berries are simple fruits with seeds in a fleshy or juicy pulp.

As for drupes, I found the cherry, peach and plum were larger relatives of the raspberry, "little drupe."

Belonging to the morning glory family, one discovers, is the "sweet" potato. We all know this food is the root of the plant, and is really not a potato, but the "Irish" potato, which originated in South America and not in Ireland, is a swelled underground stem. Less well known is the fact that this potato, together with the tomato, petunia and tobacco plant, belong to the nightshade family.

Oddly enough, the onion is a lily, although even scientists will not insist that it smells the same. Asparagus, too, is a lily. The tall, graceful elm, one of our largest trees, belongs to the same order as our lowly Nettle, an herb. The mountain ash is not related to the true ashes, being a member of the rose family, as is the peach, cherry and plum.

In the mustard family we find the cabbage, radish, and turnip; a little reflection will show a similarity. The poison "oak" is really a form of poison "ivy", which is a member of the sumac family. Our garden canna is a relative of the banana, and the "petals" of the beautiful flowering dogwood are merely developed bud scales, each bearing on its tip the part, brown and scarred, which withstood the winter storms.

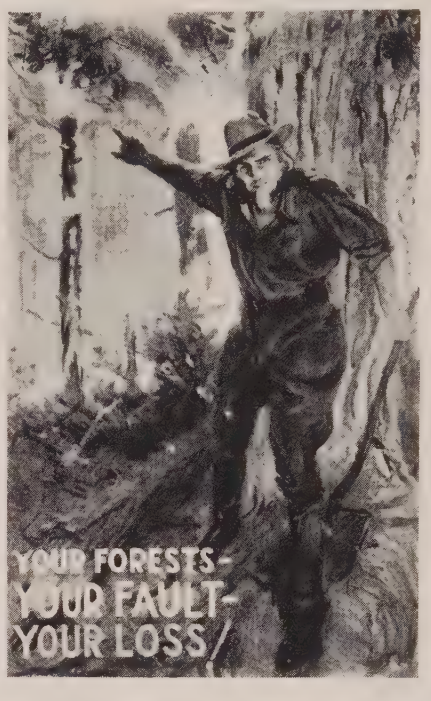
Outstanding among the birds is the "English Sparrow," now classified as a "weaver finch," but a bird that has passed its stigma on to all sparrows, and has caused many people to think that no "sparrow" is any good.

The "brown thrush" is most closely related to the catbird and mocking bird, and not at all to thrushes, to which group, however, belong the robin and the bluebird, and show their relationship in the speckled backs and breasts of the young. The meadowlark is not a lark, our only true lark being the horned lark.

The orange of our "robin redbreast" makes one wonder if the poet was color blind, but he was only singing of the English robin, which differs widely from our robin. The chimney swift, often called a "chimney swallow," is neither a swallow nor a "flycatcher," but is of a family by itself. The turkey, of course, is an American bird that became domesticated via Europe.

Animals are less often misnamed, although the North American wild goat is an antelope, and the American "buffalo" is a bison.

Any reference book will lead merrily on this chase for misnomers.



A CALL FOR FOREST PROTECTION

President Roosevelt has received, on behalf of the Government, a painting given by James Montgomery Flagg as an aid toward the fire prevention campaign being carried on by the Forest Service. The painting will be made into posters and distributed throughout the country. Mr. Flagg, famous for his war posters "Tell It to the Marines" and "I Want You," has depicted Uncle Sam in the uniform of a forest ranger demanding that carelessness in the woods be stopped.

In accepting the painting, Mr. Roosevelt said:

"More than thirty years ago Theodore Roosevelt began a great battle which I have been proud to renew, the battle to conserve and rebuild our natural resources.

"America's forests are at last getting the care and the opportunity for renewal which they demand and which we depend upon. But the great enemy of our forests now is fire—fire that is started, nine times out of ten, by the carelessness of man.

"Carelessness can be prevented, and it is to that end that James Montgomery Flagg has painted and presented to the nation this vivid picture. I hope all who visit the national forests will see it, for I am sure that, having seen it, they will remember it.

"It is with deep gratitude that I accept this painting on behalf of the United States Government."

F. A. Silcox, Chief of the Forest Service commented as follows:

"Mr. Flagg has gone straight to the essential point in the problem of fire control —the human element. His title tells the whole story in rapid-fire style. America's forests are literally 'Your Forests.' Forests, no matter where they are, under private, state or federal ownership, influence the daily lives of millions of people directly dependent for a livelihood on forest products, and additional millions who use the forests for hunting, fishing, camping, and other forms of recreation. Green forests protect watersheds; exert a powerful control on the sources of floods.

"The second part of Mr. Flagg's title—'Your Fault'—means just this: ninety per cent of all the forest fires in the nation are man-caused. Because they are caused by man, they are preventable.

"Due to the close interrelationship between the forest and our everyday life, the phrase 'Your Loss' becomes equally true. It may reasonably be said that when a forest burns, everybody loses. Mr. Flagg has made a valuable contribution in the fight against forest fires which burn annually over an area almost as large as the entire State of Washington."

Whose Kittens?

By Mrs. Edgar B. Kincaid

One evening the painter had left the door to the screened-in back porch propped open to dry. The next morning we found two of the ranch cats, which were never allowed in the house, had transformed a large paper carton on the porch into a nursery. There were four newly-born kittens, with both mother cats in attendance.

By the most careful observation we were never able to learn whether one was the mother of all, or whether some of the kittens were born to one cat and some to the other. Perhaps one mother was sharing her babies with the other less fortunate mother. At any rate there was always peace and harmony in the family and the kittens thrived under so much care.

The paint dry, the box was moved out under a tree in the yard. One stormy day when lightning flashed and thunder roared, we missed the kittens and their black mother from their accustomed place. "Gray Mama" cried pitifully, seeking her babies first in their box and then climbing up the screen trying to get on the porch again.

A little inspection tour disclosed that the kittens had been moved to a nest in the hen house, apparently to get them out of the threatening weather. "Gray Mama" ceased her cries as soon as she was lifted into the nest. The two older cats seemed happy to be reunited, and the kittens soon grew fat and silken-haired.

Hens continued to lay their eggs in the nest, and more than once we found the kittens cuddled up to the hen lying with their heads against protecting wings. Not once did a hen seem to resent the intruders. They were allowed to remain in the chicken house until they followed their mothers back to the door step of their own accord. It was interesting to note both cats feeding and bathing the kittens from day to day and not forgetting to give each other a few affectionate licks too. Now the babies are large enough to drink milk out of a big pan with the grown-up cats. I am sure they know no more about their parentage than we do.

Gardeners Meet

The 27th annual convention of the National Association of Gardeners will be held at the Warwick Hotel, Philadelphia, August 10 to 12.

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"HALLOWED BE THY NAME", A PHOTOGRAPHIC STUDY BY BOB LEAVITT, A. R. P. S.
The print at the left is a straight print. In the one at the right note the improvement effected by dodging in background and darkening corners. The shawl is printed in to show detail, while the box under the hands is held back in order to allow other portions to print in. This is an excellent example of skillful dodging.

Photographic Notes

BY SAMUEL BROWN

The Movie Camera

The past few months have brought many letters to this department asking for information on motion pictures. Since the making of moving pictures has become so practical with tiny film, more and more persons have turned to this phase of photography for an animated expression of their hobby. Perhaps the most important contributing factor toward this, besides the use of sub-standard width film, is the introduction of Kodachrome film for amateur movies. To watch the action of a fast moving mountain goat, the flight of a bird, insects at work and a host of other activities of Nature's children is a rare pleasure indeed. In color, these pictures take on a new beauty that is fascinating. This month we select some of the most interesting questions asked by our readers and give some general hints for the improvement of ciné photography.

Many persons wish to know how practical 8 mm or 16 mm motion pictures are and which is the best choice. Either will make excellent movies and the choice depends mostly on whether the pictures are to be used for auditorium projection or just in the home. Good 16 mm pictures will project to an unusually large size with remarkable clarity. Kodachrome pictures, due to the absolute absence of grain, may be projected to almost unlimited proportions. In the case of 8 mm pictures, black and white movies, providing they are properly made, may easily throw a screen image of about two by three feet, while Kodachrome will give a much larger size.

Questions on the technique of shooting color film are often asked. There are several special precautions that should be observed when making color movies. Lighting is extremely important. This should be flat and, preferably, well diffused. Never make color movies when there are harsh shadows because this throws the color balance off in either the well-lit or shadowed sections, depending on the exposure. While brilliantly-colored objects sometimes make pretty pictures, any clash of contrasting colors should be avoided. For example a brilliant red object next to a bright green one causes an annoying and tiresome sensation to the audience. This is to be avoided as much as possible. Make colors harmonize so that the movies appear natural.

Kodachrome film is supplied in two forms —regular for daylight and type A for artificial light. Except where one type is to be used with light to which it is not especially sensitized, filters are unnecessary. However, when regular film is used in artificial light a light blue filter must be used while when artificial light film is used in daylight a filter having a pink cast is required. When making Kodachrome movies over a great distance, particularly in telephoto work, a haze filter is required. This is absolutely colorless and requires no increase in exposure. Pictures taken without the haze filter have an overall purplish color caused by the abundance of ultraviolet light. The last important step toward good color movies is accurate exposure. Most black and white film has considerable latitude which permits much over- or under-exposure with good results. Color film does not possess this latitude and exposure is critical. When the diaphragm opening is too large the pictures come out over-exposed or extremely light giving weak, washed-out colors with no detail in the highlights. With the diaphragm too small, the film is too dark, colors are heavy and detail in dark portions is obviously missing. Always follow carefully the instructions for exposure paying particular attention to direction of light, color of object, time of day, etc.

One of the most important things in the art of movie making comes after the film has been shot. Good editing often saves pictures that would otherwise be boring and uninteresting. One of the big questions is how long should an individual scene be. A safe rule is to make action shots showing the beginning, through the action and its finish. Still shots should last approximately five seconds. It is generally advisable to make these longer in the camera and cut them after the film is processed.

By cutting is meant the separating of the scenes into individual strips and reassembling them so that they tell a consecutive story and this is the most important operation in editing. It is sometimes impossible to photograph scenes with the continuity that is required in the finished picture. These may, however, be shot as convenient and then rearranged, pieces discarded and cut as is

equired finally.

We have given above some of the primary ssentials to good movie making. The art f ciné photography is fascinating and deep nd allows for more originality than almost ny other phase of the hobby. If our readers ill express their opinion and if sufficient equests are received, this department will gain take up the subject of motion picture hotography and explain how many unusual ffects may be secured.

Filters

In July and August we discussed the ifferent types of correction filters for use ith panchromatic and orthochromatic film hen used both in daylight and artificial ght. It was pointed out that correct values re to be preferred in most cases. There is nother class of filters generally referred to contrast filters with which the color balnce is deliberately upset to produce novel nd unusual effects. This is generally accomished by over-correcting certain colors to roduce the desired contrast.

The most typical subject that one generly chooses for these odd effects is a blue cy with interesting cloud formations. In rder to achieve a brilliant dramatic rendiion it is necessary to make the sky come ut black, and, with white clouds against is dark background, it makes a picture of nusual beauty. In order to darken the sky is necessary to use a filter that absorbs ue almost completely. This is accomplishd with a red filter and panchromatic film. he darker the filter, of course, the more ue it will absorb and the darker the sky ill be. If orthochromatic film is being sed, a red filter will be useless because orochromatic film does not respond to red nd none of the light will make an impresn. We therefore use an orange or heavy llow filter that absorbs enough of the blue give the necessary correction.

An interesting effect is possible just be-e sunset when the angle of the sun bend the clouds traces a beautiful golden e around the edge of each cloud. This n be captured on the film by the method ggested above. On those rare occasions en the sun throws its beams through the s in the clouds, the contrast filter will pture and magnify the beams giving anner interesting effect.

Another use for a red filter is in infrad photography to eliminate all the visible ys to which infra-red is sensitive.

One important point to remember when ing filters is that they freely pass rays of eir own color and absorb their complements. Thus a red filter passes all red rays nd absorbs blue and green, yellow passes llow and absorbs blue, etc. Since contast filters absorb so many of the actinic ys of light, a higher factor is necessary in der to get fully exposed negatives. Below e given the factors for the contrast filters n the market today.

	Orthochromatic	Panchromatic
ratten G (orange)	10	2.5
ratten A (light red)		4
ratten F (dark red)		8
fa Orthocolor 4 (orange)	10	2.5
fa Red		7
eiss G-4 (orange)	10	2.3
eiss R-10 (light red)		6
eiss R-15 (dark red)		25

Trade Hints and New Books

This department takes pleasure in again offering its readers the booklet *See America.* Illustrated with one hundred pictures taken in different sections of the country, its value as a pictorial story of America is equal to its inspiration as a book of beautiful photographs. From the dramatic city pictures to the photographs depicting American industry, its railroads, its humor, its people and buildings, the pictures show what can be done by the amateur cameraman. No charge —merely send a three-cent stamp to this department with your request.

The Eastman Kodak Co., Rochester, N.Y., announces two new Kodaks, the new Specials Six-16 and Six-20. Equipped with F. 4.5 lenses, and Kodamatic shutters, they are precision built and reasonably priced. Some added features are direct eye level view finder, new body release, one finger bed release for quick closing and large winding knob. See these cameras at your dealer's camera counter.

A new type of flash bulb has been recently announced and is known as *Super Flash Photolamp.* According to the manufacturer, the bulb presents a new departure in manufacture and assures perfect synchronization at all times. One of the outstanding features is the fact that the focal plane shutters on Leica and Contax cameras may now be synchronized and results seem to bear out this claim. A line to the Wabash Photolamp Corp., 335 Carroll St., Brooklyn, N. Y., will bring full information and interesting literature.

The Photo-Art Publisher, Monadnock Bldg., San Francisco, Calif., announces two new books by Sigismund Blumann, F.R.P.S.

The first, *Enlarging Manual* (50c), offers a new concise text on enlarging. Despite its apparent brevity, the author seems to have managed to cover almost every phase of enlarging quite thoroughly. Various types of enlargers are fully described together with the several light sources available. Selection of paper, exposure, developing, contrast, diffusion, dodging, paper negatives and many other items of an essential character are thoroughly discussed. Get this book if you make enlargements.

Mr. Blumann's second book is *Photographic Greetings* (50c). Here is a book that the photographer who makes his own greeting cards will welcome. Many original ideas are presented for still life subjects, how to make a master negative from which many cards can be made, hints on toning and silhouette making. The formulary includes toners for different colors and the book finishes with some suggestions for making the cards more attractive by adding color.

Natural Color Film, by Clifford Nelson, with an introduction by Herbert C. McKay, F.R.P.S. Galleon Press, 381 Fourth Ave., New York, N. Y. Price $1.50.

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(Continued on page 133)

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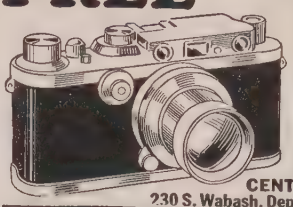

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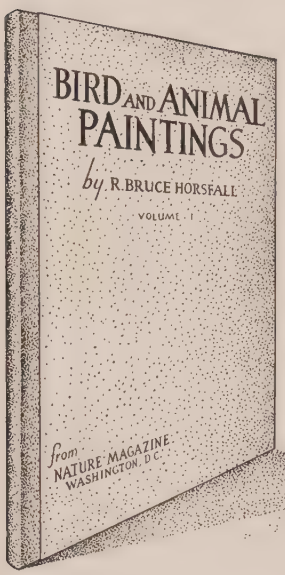

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Despite the high cost of color plates and printing, this beautifully printed, 58-page book, with its many pictures, is offered to readers of Nature Magazine at only $1.50 a copy. Send your order with remittance to

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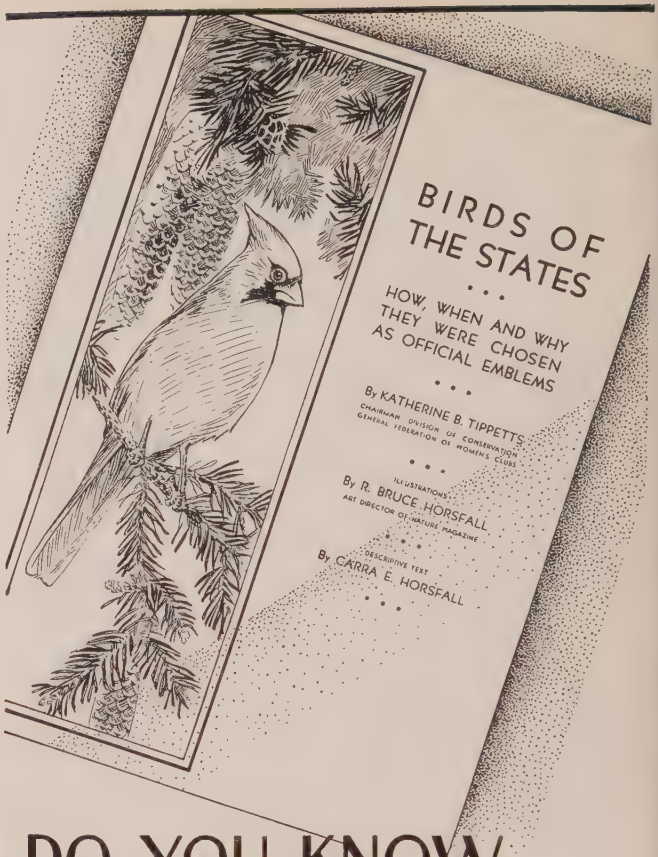
BIRDS OF THE STATES
HOW, WHEN AND WHY THEY WERE CHOSEN AS OFFICIAL EMBLEMS
By KATHERINE B. TIPPETTS
CHAIRMAN DIVISION OF CONSERVATION GENERAL FEDERATION OF WOMEN'S CLUBS
ILLUSTRATIONS By R. BRUCE HORSFALL
ART DIRECTOR OF NATURE MAGAZINE
DESCRIPTIVE TEXT By CARRA E. HORSFALL

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Every home and every school should have this book. It is a fascinating bit of history combined with an authentic and interesting survey of the birds of America. A handy table in the front lists the birds together with the official flowers of the states.

The 16-page book, with 30 illustrations, is offered to readers of Nature Magazine at 50 cents a copy. On orders for ten or more copies, the price is 25 cents a copy.

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PHOTOGRAPHIC NOTES

(Continued from page 131)

Kodachrome film for movies and still pictures. Mr. Nelson has done a commendable job on this book because it gives the amateur a starting point for making color pictures. There is much to know in using color film and the book covers all of the salient points with a real thoroughness. For example, in the chapter on what to photograph, there are many hints given for such subjects as children, animals, flowers, scenery and many more. Then for indoor shooting, lighting and exposure are fully discussed. Anyone making color pictures will find *Natural Color Film* a very readable and valuable text.

The photographic department of NATURE MAGAZINE is devoted to its readers interested in photography and maintains a service which renders assistance with any photographic matter. You are invited to take advantage of this service. Address all inquiries to Samuel Brown, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington, D. C.

Cordially,
Samuel Brown

Meet Our Authors

Vernon Bailey, retired chief naturalist of the United States Biological Survey, needs no introduction to Nature lovers. One of the country's leading mammal authorities, Mr. Bailey is now active in furthering the introduction of humane traps.

Leah Stock Helmick is the wife of an Army colonel, cherishes an active interest in Nature and finds time now and then to indulge in free lance writing.

Albert Dixon Simmons lives in Cleveland, Ohio, is author of a recently published book, *Wing Shots,* and an accomplished photographer.

Henry Clepper is a forester, and is at present executive secretary of the Society of American Foresters, official organization of the profession.

L. J. Langford is a British bird lover and photographer who has spent innumerable days, and many nights, studying and photographing wildlife in Britain.

Lewis Wayne Walker is a photographer and wildlife student from California. He has been represented in our pages many times during the past few years.

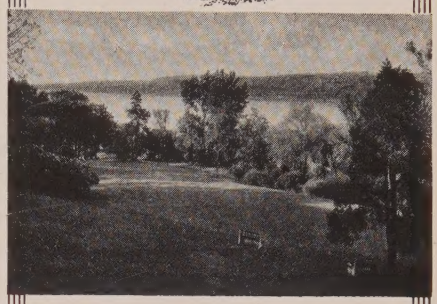
Richard Evans Schultes is a Harvard man who has devoted particular study to the peyote in connection with work at the Museum and Laboratories of Economic Botany of Harvard University.

Hugh Spencer lives in Chester, Connecticut, from which vantage point he studies, draws and photographs Nature. He has appeared often in our pages.

Ralph T. Gardner is a newspaperman and photographer, with the latter field providing his present work. Writing is an avocation and he reports interests in "education, science and invention, theosophy and Oriental philosophy."

A. M. Reese is a member of the faculty of Botany and Zoology of West Virginia University at Morgantown, West Virginia.

The American Nauheim



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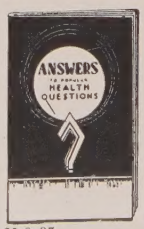

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In September—Humboldt

By HOWARD ZAHNISER

In search of a mess kit for an emergency use, I wandered one morning last summer into a second-hand store in Boulder, Colorado, where the merchandise seemed as varied as that of a city drug store. I found no mess kit among the dishes, furniture, "objects of art", and discarded equipment of former tourists; but tossed aside on a couple of shelves were some items that, once looked upon, banished for the moment all concern for such simple wants as eating utensils. They were books. I spied a copy of Seton's *The Arctic Prairies* with its record of experiences he shared with Edward A. Preble, and it did not take me long to purchase that. I had, however, been sent for food as well as utensils. It was before breakfast, and my wife was waiting in a cabin nine miles away. We were on a sort of honeymoon, and I knew I dare not trust myself facing two shelves of books in that situation. Of course, though, I returned; and that time, leaving only a dollar and a quarter (in addition to seventy-five cents that my wife practically wasted on a queer sort of pitcher), I walked out with two volumes of verse and a five-volume set of Alexander von Humboldt's *Cosmos: A Sketch of a Physical Description of the Universe!*

Humboldt is one of those titans whose names are known to all but whose works have become such an essential part of the equipment of later writers that few know them at first hand. Sixty-nine years ago on the fourteenth of this month there were many celebrations of his centennial, and some of the most enthusiastic remembrances of this German born in Berlin were by gatherings of Americans. The man himself had missed the centennial by only a few months more than ten years (he died May 6, 1859), and his *Cosmos* was a product of his old age. His works were fresh in men's minds in his centennial year, but now 169 years after his birth he has many librarians but few readers.

It is only an accident, of course, that I have found how unfortunate that is; I failed to find a mess kit but I found the *Cosmos!* It has taken a year to go through these five volumes, and I do not know that I should try to hold anyone over the last three. Few serious students of Nature, however, would willingly miss the first two. Volume I, with its introduction to the whole work and its "General Review of Natural Phenomena", though written before many important discoveries, is at once a significant synthesis of knowledge and an inspiring revelation of a marvellous man. I have marked thirty passages for quotation on this page (!), but it will have to be enough to note that in the last one the author recalls that in this one volume "from the remotest nebulæ and from the revolving double stars, we have descended to the minutest organisms of animal creation . . . and to the delicate vegetable germs which clothe the naked declivity of the ice-crowned mountain summit". Volume II, I should say, is of even more interest, for it aspires "to depict the contemplation of natural objects as a means of exciting a pure love of nature, and to investigate the causes which, especially in recent times, have, by the active medium of the imagination, so powerfully encouraged the study of nature and the predilection for distant travels". It is, in fact, a history of man's attitude toward Nature, as valid as when it was written. Humboldt gleaned from the ancients of all languages. He writes, for instance, in one place that "it might almost be said that one single psalm (the 104th) represents the image of the whole Cosmos", and he quotes the psalm. Again, in discussing the absence of graphic descriptions in the *Araucana,* by Don Alonso de Ercilla, he confesses in a footnote that he had "read through the whole of this poem (which, unfortunately, comprises 42,000 verses) on two occasions, once in Peru, and again recently in Paris". From the Greeks, the Romans, Minnesingers, Persians, Arabs, and others, Humboldt thus gathered the material for this history of Nature's effect on man's mind.

Though famous as the first physical-geographer, Humboldt is, of course, best known as a great traveler, and it is interesting to note in the *Cosmos* that the inducements to travel, experienced in his early years, were three: A description of the South Sea Islands, some paintings of the shores of the Ganges, and "a colossal dragon-tree in an old tower of the Botanical Garden at Berlin". I went to the Library of Congress to gather more biographical information, but after going through the monumental *Life* edited by Karl Bruhns, I decided that perhaps on this occasion it would be enough for me to pass on the note in the "Introduction" that "Humboldt detested all biographies". For there are two others of his many writings that I should like to recommend: *Aspects of Nature,* essays, and, certainly, his *Personal Narrative of Travels to the Equinoctial Regions of the New Continent, During the Years 1799-1804.*

Humboldt's works on his travels in this hemisphere included 17 folio, 9 quarto, and these 7 octavo volumes. The *Personal Narrative* tells of only a third of his wanderings on this side of the Atlantic. Yet they seem enough for a life-time. Should you wish this September to undertake a longer arm-chair expedition than usual, I suggest that you find a copy of Volume III and retrace in the first 200 pages the travels of Humboldt in another September along the coast and in the mountains of northern South America. I can suggest, for one thing, that you will see how "swarms of flamingos, egrets, and cormorants filled the air, seeking the shore, whilst the alcatrás, a large species of pelican, alone continued peaceably to fish in the middle of the gulf" of Cariaco.

On my return from Colorado last summer I noticed in Tower Grove Park, St. Louis, a bronze figure of Humboldt, by Frederick V. Miller, erected by Henry Shaw, and on it the inscription: "In honor of the most accomplished traveler of this or any other age."

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